ARCHIVES

OF

OPHTHALMOLOGY

FOUNDED IN 1869 BY

DR. HERMAN KNAPP

EDITED IN ENGLISH AND GERMAN

BY

DR. ARNOLD KNAPP
OF NEW YORK

AND

DR. C. HESS
OF WÜRZBURG

AND

DR. W. A. HOLDEN
OF NEW YORK

VOLUME XL.

NEW YORK

G. P. PUTNAM'S SONS { 2, 4, & 6 WEST 45TH STREET
27 & 29 WEST 23D STREET

AND NEW ROCHELLE, N. Y.

LONDON: 24 BEDFORD STREET, STRAND

WIESBADEN: J. F. BERGMANN'S Verlag

PARIS: J. B. BAILLIÈRE, 19 Rue Hautefeuille

1911

The Knickerbocker Press, New York

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M.

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ARCHIVES OF OPHTHALMOLOGY.

THE RELATIONSHIP OF THE SO-CALLED TRACHOMA BODIES TO CONJUNCTIVAL AFFECTIONS.[1]

BY HIDEYO NOGUCHI, M.D.
AND
MARTIN COHEN, M.D.

PATHOLOGICAL AND BACTERIOLOGICAL STUDIES WERE CONDUCTED BY DR. NOGUCHI AT THE LABORATORIES OF THE ROCKEFELLER INSTITUTE FOR MEDICAL RESEARCH, N. Y.

(With five illustrations on Text-Plates I. and II.)

THIS study was first undertaken by us a year ago with the purpose of investigating the relationship of the so-called trachoma bodies to conjunctival diseases. A paper giving an historical review of these so-called trachoma bodies and a description of the method of making smears and sections for their detection has already been published by us.[2] In the present study Dr. Noguchi personally examined over 10,000 smears and sections in the following conditions:[3]

[1] Read before the Ophthalmological Section N. Y. Academy of Medicine, Nov. 21, 1910.

[2] *Transactions* of the Pathological Soc. of N. Y., 1910, vol. x., p. 20.

[3] The cases on which this study is based were derived not only from Dr. Cohen's service at the Randall's Island Hospital and from the Harlem Hospital, but also through the courtesy of the following gentlemen, to whom we wish to express our indebtedness: Dr. George W. Stoner, Chief Medical Official at Ellis Island; Dr. Albert N. Wigglesworth, Medical Officer at the Indian Reservation, Fort Defiance, Arizona; Dr. Arnold Knapp, New York Ophthalmic and Aural Institute; Dr. C. W. Cutler and staff, New York Foundling Asylum; Dr. H. W. Wootton, Manhattan Eye and Ear Hospital; Dr. J. M. Wheeler, New York Eye and Ear Infirmary; and Dr. V. C. Pedersen, Genito-Urinary Department, Hudson Street Hospital.

1st, Normal conjunctiva of the new-born (white).

2d, Normal conjunctiva of the new-born (colored).

3d, Conjunctivitis catarrhalis (acuta).

4th, Conjunctivitis catarrhalis (chronica).

5th, Conjunctivitis associated with measles, scarlatina, and diphtheria.

6th, Conjunctivitis, due to foreign bodies on the conjunctiva or cornea.

7th, Conjunctivitis, due to atropine.

8th, Conjunctivitis vernalis.

9th, Folliculosis conjunctivæ.

10th, Conjunctivitis follicularis.

11th, Trachoma { hypertrophic or granular. / cicatricial / acute type? or mixed infections?

12th, Blennorrhœa neonatorum gonorrhoica.

13th, Blennorrhœa neonatorum non-gonorrhoica.

14th, Blennorrhœa gonorrhoica in adults.

15th, Blennorrhœa gonorrhoica in children.

In order to study morphologically and culturally the relationship claimed by Herzog to exist between the gonococcus and the so-called trachoma bodies, numerous smears were taken from the male urethra in various stages of gonorrhœal urethritis and from the vagina in gonorrhœal vaginitis. This phase of the subject is still under investigation by Dr. Noguchi. Smears were also taken from the cervix and urethra of three mothers whose children had blennorrhœa neonatorum non-gonorrhoica but the bodies were not found. In smears made from the accessory lachrymal gland and sac in three cases of chronic trachoma the bodies were absent.

In the first nine classes of cases above enumerated the so-called trachoma bodies were uniformly absent.

Folliculosis conjunctivæ is the term applied by Saemisch to the non-inflammatory, non-communicable condition in which minute superficial isolated follicles are scattered over the lower conjunctiva. These follicles show no tendency to increase in size and number, and after months or years disappear regardless of treatment, leaving no trace of their previous existence on the conjunctiva. In the 30 cases of

TO ILLUSTRATE DRS. NOGUCHI AND COHEN'S ARTICLE ON TRACHOMA.

Preparations by Dr. Noguchi.

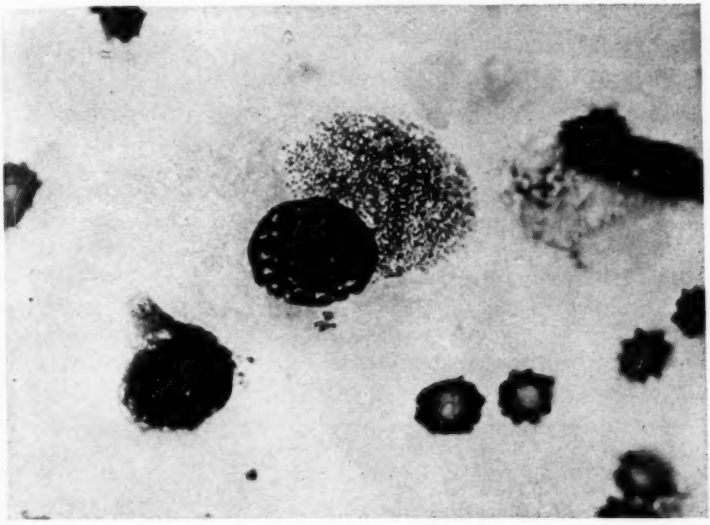

FIG. 1.

Last developmental stage of trachoma bodies, with very little plastin mass.

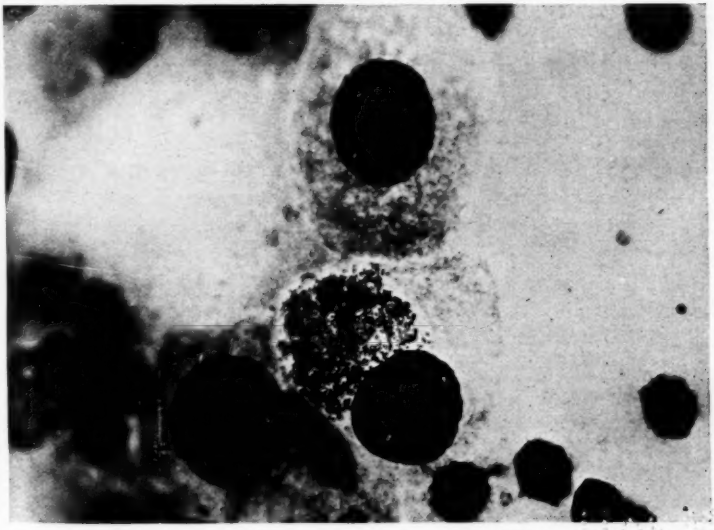

FIG. 2.

Moderately grown trachoma bodies, showing plastin mass and elementary granules.

folliculosis conjunctivæ studied no so-called trachoma bodies were found.

Conjunctivitis follicularis is to be distinguished from the above and, according to most authorities, is a chronic progressive communicable inflammation of the conjunctiva characterized by the presence of follicles usually situated in the lower conjunctiva, these follicles afterwards gradually spreading to the upper folds and caruncles, and lastly in the terminal stage to the upper tarsal conjunctiva. After increasing in size and number these follicles coalesce to form lymphoid masses in the folds, these masses ultimately becoming absorbed and leaving the conjunctiva apparently normal. At a certain stage of this cycle, the process temporarily becomes stationary in many of these cases; for instance, numerous follicles may remain discrete and become absorbed instead of coalescing. In the great majority of these cases, in which there was no clinical resemblance to typical trachoma, no so-called trachoma bodies were found. The results of animal inoculations in this type of cases will be reported by Dr. Noguchi at some future date.

Of the 250 cases studied, 66 were of a marked type; these occurred principally in children, and might be spoken of as borderland cases, since clinical differentiation from trachoma was impossible. The so-called trachoma bodies were found in 9 of these 66 cases; in the remaining 57, repeated and careful search in both smears and sections failed to reveal any bodies. These severe cases, observed for periods varying from one to several years and including those in which the so-called trachoma bodies were found, have not been followed by pannus and scar-tissue formation, though from time to time granules reappeared in spite of expression and post-operative treatment. The expression operation accomplishes escape of the lymphoid secretion from the follicles, but the hard reddish granules beneath and between the follicles are not thus removed. This failure to displace by normal or cicatricial tissue these sand-like bodies is probably an important factor in the frequent recurrences. When there is a granular appearance of the conjunctiva associated with an acute catarrhal inflammation, *e.g.*, an acute catarrhal conjunctivitis superimposed upon a conjunctivitis follicularis, the probabil-

ity of a mixed infection must be borne in mind; the history and bacteriological examination will be of aid in such a contingency.

Trachoma.—Trachoma is a chronic communicable inflammation of the conjunctiva evidenced by the gradual formation of granules or papules or both, or by a diffuse hypertrophy of the conjunctiva; these conditions usually resulting in superficial or deep cicatrization of the conjunctiva with or without pannus. The medical profession has long sought some positive clinical characteristic or some definite laboratory aid which would serve to differentiate incipient trachoma from the other conjunctival affections simulating it. When Halberstaedter and v. Prowazek and Greeff in 1907 announced the discovery of certain cell inclusions, which they regarded as the efficient cause of the disease, our present work was started with the view of corroborating or refuting this deduction.

In 60 cases of typical trachoma, as evidenced by hypertrophy, cicatrization, or pannus, smears from the conjunctiva were made and so-called trachoma bodies were present in 36, or 60%, of the cases. The bodies were found in 12 out of 15 cases in American Indians. Post-operative cases as well as those under recent treatment with the copper stick are included. In several cases in which the affected conjunctival tissue was removed as a therapeutic procedure, the tissues were prepared for animal inoculation immediately after ablation; the results will be published later by Dr. Noguchi.

The experience with families, some of whose members were affected with trachoma, and the observation in institutions in which the disease was prevalent, have enabled us to study the communicability of this disease, the clinical course which it follows almost from its inception, and the frequency of the so-called trachoma bodies in those affected. All of these cases which were of a rather acute type, 14 in number, showed the presence of the so-called trachoma bodies. In some of the early cases observed, the entire conjunctiva during the first week was congested and swollen and showed slight mucoid secretion and medium-sized follicles in the lower folds. These follicles increased gradually in size and number

TO ILLUSTRATE DRS. NOGUCHI AND COHEN'S ARTICLE ON TRACHOMA.

Preparations by Dr. Noguchi.

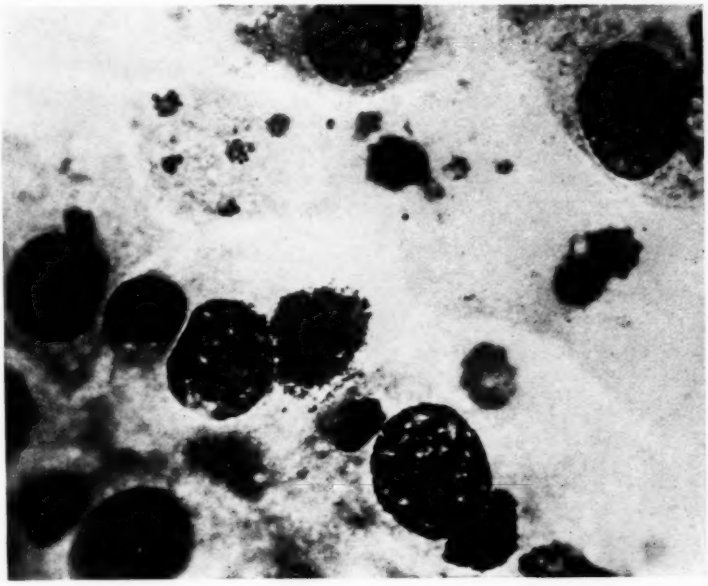

FIG. 3.

Initial stages of trachoma bodies, and somewhat advanced stages. Multiple infection.

FIG. 4.

Trachoma body in blennorrhœa gonorrhoica in children. Simultaneous presence of regular gonococci and trachoma granules in one epithelium.

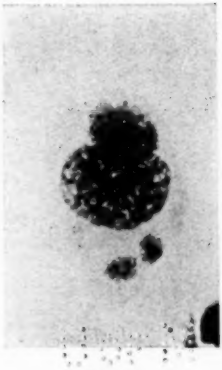

FIG. 5.

Trachoma bodies in blennorrhœa gonorrhoica in children. Showing typical trachoma bodies.

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for the following three weeks and covered the tarsal conjunctiva, giving it a sand-like appearance. This condition remained stationary in some cases for several months and then the process retrograded, the follicles on the upper tarsal conjunctiva became absorbed, the congestion diminished, and finally the lower conjunctiva, after exhibiting the sand-like appearance above referred to, became restored to normal. The usual time required for this resumption of a normal appearance was three or four months, though in some cases the time was much longer. In two cases which have been under observation for eight months a finely granular appearance of the lower conjunctiva is still present. Only mild therapeutic measures were employed except in those few cases showing no tendency to ameliorate. In two cases with acute manifestations, in which the bodies were present, the inflammation involved only one eye, but showed the same course as in the bilateral cases just described. The fact that in 12 of these 14 cases there was complete restoration of the conjunctiva to normal without pannus or cicatrization would seem to indicate the existence of a conjunctival affection pathologically independent from trachoma though clinically simulating this disease for a certain period. Whether the bodies which were constantly associated with this affection are its sole cause remains for future investigation to determine.

Of 11 cases of trachoma in children, with pannus and cicatrization, the bodies were found in 7 of the cases.

In a case of conjunctivitis follicularis in which smears failed to show the bodies, there suddenly supervened an acute catarrhal inflammation of the conjunctiva. On the nasal side of the left bulbar conjunctiva near the limbus, there also appeared a small patch of spawn-like tissue. Separate smears taken from the inflamed conjunctiva and the patch revealed the so-called trachoma bodies. In two weeks the inflammation subsided and the infiltrated area in one eye disappeared; smears taken as before at this time and two weeks later were negative.

The only complication seen with these acute manifestations was a temporary partial ptosis of one eye in two cases.

Blennorrhœa neonatorum gonorrhoica.—All the 12 cases had the characteristic features of this disease. Only one smear

was made from each case and this in the early stages of the disease; gonococci were uniformly present, the bodies uniformly absent.

Blennorrhœa neonatorum non-gonorrhoica.—Six cases of this disease were studied, their ages ranging from four days to two weeks; the bodies were found at periods varying from four days to two weeks after birth. In one case the bodies were regularly found as late as three months after birth. The clinical appearance of these cases resembled mild cases of blennorrhœa gonorrhoica, which in its earliest stage is characterized by a diffuse conjunctival congestion with a mucoid secretion from the conjunctiva. This condition remains about one week, when the conjunctiva assumes a papillary appearance and a few follicles are seen on the upper fold as well as on the lower. This papillary appearance lasts about two months, when the process regresses simultaneously with the gradual disappearance of the bodies and the return of the conjunctiva to normal in three to four months.

In one of these cases the conjunctiva was more congested than in the other five and there was present on both upper tarsal conjunctivæ a pseudo-membrane. This patient, after two weeks in the Maternity Ward, was taken home; three days later the mother returned with the child, the condition in the child's eye slightly improved, but in the mother the conjunctiva of one eye was slightly congested with a few follicles present and a slight mucoid secretion. A conjunctival smear from the mother's affected eye revealed the presence of so-called trachoma bodies, and these were found at intervals for three months. One week after the original involvement in the mother's eye, her other eye, previously normal and free from bodies, became similarly affected. The clinical course in this case was similar to those observed in acute manifestations simulating trachoma. The total duration was about five months; the cornea remained clear, and with the exception of a few fine granules in the lower conjunctival fold the appearance of the conjunctiva was normal.

Blennorrhœa gonorrhoica in adults.—There were four cases with typical appearances. One smear was made in each instance and this revealed only the presence of the gonococcus.

Blennorrhœa gonorrhoica in children.—In an epidemic at the Randall's Island Hospital in January, 1910, there were 13 cases of blennorrhœa gonorrhoica all occurring in the same pavilion. Conjunctival smears uniformly showed the gonococcus but no so-called trachoma bodies.

In a second epidemic occurring five months later in the same pavilion, there were 30 cases of this disease in girls from five to fifteen years of age. After 6 cases had developed, these and the successive cases were transferred to another ward until within a few days there were 30 patients isolated, all of whom had a marked ophthalmia evidenced by intense edema of the lids, pyorrhea, a diffuse congestion and folding of the conjunctiva, and, in a few cases, a necrotic membrane covering the tarsal conjunctiva. Vaginal smears taken at the outset showed the gonococcus but no bodies in 6 of the cases. Conjunctival smears in all of the cases showed both gonococci and so-called trachoma bodies, but the irregularity of their discovery and the inconstancy of their association were noteworthy. For four months smears were taken repeatedly at intervals of a few days. Sometimes there would be found gonococci alone, at other times so-called trachoma bodies alone, and occasionally both gonococci and bodies. Towards the end of the illness naturally the gonococci were less numerous and frequent, but the bodies persisted even after practical cure of the disease. One case constituted an exception to the above findings in that gonococci alone were found throughout the course of the disease, though clinically the case was similar to the other 29. The course of these cases resembles that of blennorrhœa gonorrhoica as seen in adults, the papillary stage of which is hardly distinguishable from trachoma. In most of our cases after regression from the papillary stage of the disease, the conjunctiva became normal in from three to four months. In several of the cases there is still slight congestion of the lower conjunctiva and a few fine granules are present in the folds. The cornea was free from infection in 28 of our cases; of the remaining 2, one already had a perforating ulcer when placed under our care, and the other developed a small perforating ulcer while under treatment. It might be instructive, owing to the gravity of the condition and the results obtained, to note the treat-

ment employed, which consisted of application to the lids of ice compresses, boric acid irrigations given almost continuously with the fountain syringe, and between the irrigations cleansing the accessible conjunctiva with gauze moistened with boric acid. This treatment was carried out night and day by a corps of nurses, and no other medication was employed.

We present the results of our findings of so-called trachoma bodies in different conjunctival affections in the following table.

Name of Conjunctival Affections.	No. of cases.	So-called trachoma bodies.		Gonococci found.
		Found.	Not found.	
1st, Normal conjunctiva of the new-born (white)	25	0	25	
2d, Normal conjunctiva of the new-born (colored)	10	0	10	
3d, Conjunctivitis catarrhalis (acuta)	30	0	30	
4th, Conjunctivitis catarrhalis (chronica)	10	0	10	
5th, Conjunctivitis associated with measles, scarlatina, and diphtheria	18	0	18	
6th, Conjunctivitis due to foreign bodies on conjunctiva or cornea	6	0	6	
7th, Conjunctivitis due to atropine	2	0	2	
8th, Conjunctivitis vernalis	11	0	11	
9th, Folliculosis conjunctivæ	30	0	30	
10th, Conjunctivitis follicularis	250	9	241	
11th, Trachoma { hypertrophic or granular	60	36	24	
11th, Trachoma { cicatricial	9	4	5	
11th, Trachoma { acute type? or mixed infections	14	14	0	
12th, Blennorrhœa neonatorum gonorrhoica	12	0	0	12
13th, Blennorrhœa neonatorum non-gonorrhoica	16	6	10	
14th, Blennorrhœa gonorrhoica in adults	4	0	0	4
15th, Blennorrhœa gonorrhoica in children	43	29	14	43

CONCLUSIONS.

The following conclusions may be drawn from our bacteriological findings and clinical observations:

1. The uniform absence of the so-called trachoma bodies in the first nine groups of cases disproves the theory that the bodies are merely the result of local irritation, be it mechanical, chemical, inflammatory, or toxic.

2. The absence of the bodies in all but 9 of the 250 cases of conjunctivitis follicularis shows that they are rarely associated with this disease.

3. The frequent but inconstant presence of these bodies in *trachoma*, *blennorrhœa neonatorum non-gonorrhoica*, and *blennorrhœa gonorrhoica in children*, is an associated phenomenon whose exact etiological significance in these diseases remains to be solved by future investigations.

The finding of the bodies in the conditions mentioned above suggests to us the hypothesis that the so-called trachoma bodies represent an etiological factor in an independent conjunctival affection which is not complicated by pannus or cicatrization and which clinically resembles trachoma with acute manifestations or the papillary stage of blennorrhœa gonorrhoica. On this hypothesis the presence of the so-called bodies in trachoma and in blennorrhœa gonorrhoica is to be interpreted as the result of the engrafting of the disease caused by these bodies on the original affection.

ON THE OCCURRENCE OF THE PROWAZEK AND HALBERSTAEDTER BODIES IN THE NORMAL CONJUNCTIVA OF MAN AND APES.

(PRELIMINARY COMMUNICATION.)

By Dr. G. ADDARIO, Jr.

(From the Institute for General Pathology, Palermo. Director, Prof. Trambusti.)

Translated by Dr. Alfred Braun, New York.

IN 1907, Prowazek and Halberstaedter published their first findings concerning the presence of small intra-epithelial bodies in the trachomatous conjunctiva, which they considered to be specific for this disease, which is supposed to be a purely epithelial affection, while the formation of follicles is a secondary appearance. According to these observers, these special structures are reaction products of the cell to the toxic action of the parasites which are specific for trachoma, which belong to the class of chlamydozoa, and thus resemble the causative agents of variola and vaccinia (Cytorictes of Guarnieri), of scarlatina (Cyclasters of Mallory), of rabies (Negri's bodies), of silk-worm icterus (Bolles's polyhedric bodies), and of molluscum contagiosum (molluscum bodies). Within the above-mentioned enclosures, they observed, with artificial illumination (immersion objective 12), with a light areola, round, coccus-like, red or reddish-violet bodies, which multiply by division, assuming the form of diplococci.

These are at first larger, and then visibly diminish in size. The reaction product of the host cell, formed of plastin masses, becomes markedly swollen through the rapid multiplication of the parasites; about these parasites, the plastic

material divides, and forms islands, which are then reabsorbed, so that finally there appear numerous cocci within alveoli adjacent to the nucleus, which later pass out of the cell body. These minute granules resemble those discovered by Volpino in Negri's bodies, those which Gamaleia saw within the cyclasters of Mallory in scarlatina (5 bodies surrounding a 6th central one, on account of which they received the name Synantozoön scarlatinæ), and those which Prowazek himself discovered in corneal vaccinia within Guarnieri's bodies, and lying without the bodies, in small alveoli in the protoplasm of the epithelial cells.

Almost simultaneously, Greeff, Frosch, and Clausen published similar findings in the conjunctival secretion, in the epithelium, and in the contents of trachomatous follicles, in the form of minute point-shaped double bacilli, which appear round under 2000 magnification, sometimes resembling double bacilli, and are always surrounded by a light areola, and lie in cells near the nuclei, sometimes singly, and sometimes in groups.

They do not know which is the initial form, and are in doubt whether the group is the individual, or whether it is a heap of a species of very minute bacteria. Therefore they prefer to call such structures "Trachoma bodies." It is noteworthy that the above-mentioned authors were unable, in their second series of researches, reported in a second communication on the above subject, to find the trachoma bodies in normal conjunctival epithelium.

Mijaschita, on the contrary, claimed that he found in the normal conjunctiva structures similar to the above-mentioned bodies; these were sometimes round, sometimes semilunar in shape, bluish-violet in color, lying near the nucleus, non-granular, sometimes resembling high hats, or cylindrical and of a brownish-violet color, sometimes of a reddish-violet color, like that of the nucleus, formed of the destroyed nuclear membrane. According to the author, they differed from trachoma bodies in that, in the majority of cases, they had the form of high hats or cylinders; in the minority, that of low hats or half moons, were mostly of a brownish-violet to reddish-violet color, had a homogeneous structure, with absence of granula, resulted from a destruction

of the nuclear membrane, and could be considered only as a cast-out nuclear mass; in fact, only seldom was there a distinct zone between them and the nucleus.

Bertarelli and Cecchetto also consider the Prowazek bodies to be specific for trachoma, and believe that they are more likely to be parasites than cell inclusions.

Addario, on the contrary, doubts their specificity, as he also found them in other forms of conjunctivitis, diplococcus conjunctivitis, blennorrhœa, and subacute catarrhal conjunctivitis with negative bacterial findings; he also succeeded in finding them in the normal conjunctiva, in which he saw "a number of protoplasmic inclusions" (3–4 in a preparation rich in cells), which had the usual forms, sometimes smooth, sometimes wrinkled, sometimes strewn with few, and sometimes with many dark red points.

Following these communications, there appeared, in rapid succession, many others, which made the assumption of Prowazek and Greeff, that the trachoma bodies were specific for this disease, very unlikely.

Numerous ophthalmologists observed the bodies in the most varied forms of conjunctivitis, which had nothing to do with trachoma: in blennorrhœa neonatorum (Addario, Stargardt, Schmeichler); in diplobacillus conjunctivitis (Axenfeld); in diplococcus conjunctivitis, and the catarrhal forms with negative bacterial findings (Addario); in spring catarrh (Thierfelder, Lodato); in 5 cases of ophthalmia neonatorum, without gonococci (Prowazek and Halberstaedter, who, although they recognize the resemblance to trachoma bodies, think that they are specific for that form of conjunctivitis, but differ from the micro-organism of trachoma; Lindner, who, having found the characteristic inclusions in a case of ophthalmia neonatorum without gonococci, thinks that such forms of conjunctivitis with negative bacterial findings must be considered as trachoma); finally, in a case of acute conjunctivitis, lasting 10 days, with papillary, non-trachomatous swelling, and in a case of membranous streptococcus conjunctivitis (zur Nedden, who is of the opinion that the Greeff bodies, which are anything but specific for trachoma, are found in large numbers in all forms of conjunctivitis which are distinguished by marked papillary hypertrophy).

Add to this the fact that in several works the constant appearance of these bodies in trachoma is denied (Gutfreund and Reis, of whom the one found them only 47 times in 160 cases, and the second, only twice in 100 cases; Heiman, who, whereas he found them 4 times in 7 cases of gonorrhœal ophthalmia, found them only 5 times in 10 cases of recent trachoma); we must also consider that in the trachoma cases in which the findings are positive, they are scattered; "in each preparation, rich in epithelial elements, 1 to 2 Prowazek bodies are found" (Addario).

The theory of the specificity of these bodies received a final blow through their presence in the epithelium of the normal conjunctiva, as pointed out by Mijaschita and Addario, of whom the former considered them to resemble the trachoma bodies, but to differ from them in their appearance, their origin, and their significance, and the latter (whose numerous preparations of the normal conjunctiva I had ample opportunity to examine) considered them to be identical with the trachoma bodies.

Further examinations, however, were necessary to determine the significance of such findings.

For this purpose, I examined the epithelium of the normal conjunctiva of 5 individuals: one 7-year-old boy, one 70-year-old man, one 60-year-old woman, one 20-year-old woman, and a 22-month-old child.

The technique employed by me was as follows: the conjunctiva was scraped with the edge of a cover-glass, the material spread out upon a slide, dried in the air, and allowed to harden for 20 minutes in equal parts of absolute alcohol and ether. It was stained in Giemsa solution (1 drop per *cm*), in which the preparation lay about 12 hours.

In examining the specimens, I saw, in the cylindrical epithelium, scarcely ever in the pavement epithelium, most numerous in the youthful individuals (5–6 in a specimen rich in cellular elements), less in adult and elderly individuals (2–3), adjacent to the intact nucleus, separated from it by a sharp linear zone, small bodies, sometimes rounded, sometimes oval, and sometimes semilunar in form, with well defined outline, and granular, scarcely ever homogeneous contents, in which, under artificial illumination, it is usually

possible to differentiate various-sized granules stained deeply with the nuclear stain. These granules are sometimes spherical, and sometimes of irregular form, looking like irregularly scattered masses, surrounded by light areolæ, which remind one of the alveoli described by Prowazek and Halberstaedter as the causative agents of trachoma. Sometimes these spherical granules are arranged in pairs like cocci, reminding one of the small diplobacteria which were seen by Prowazek and Greeff in trachoma, and considered by them to be chlamydozoa. The body is often triangular, with its base against the nucleus, with the same morphologic and tinctorial appearance as the round, oval bodies; at other times, it looks like a hood with finely granular content, which, however, is never of such a character as to give the body a mulberry-like appearance. The high-hat-shaped bodies are rare, and the spherical forms, which were so well depicted by Prowazek and Halberstaedter in Figs. 1 and 5 of their first communication, very numerous.

In addition to this category of cellular elements, there are found others, although less numerous, which show pairs of intracellular masses, lying one at each pole of the nucleus, of which one has the usual hood shape, and the other is identical with the Prowazek body.

In other specimens can be seen, here and there, scattered loosely in the protoplasm of the cells the granules which are found within the trachoma bodies. But in no case did I see the entire cell body filled up with the granules, as Greeff, Herford, and others have reported. Zur Nedden was likewise unable to find this. Outside of the cells, it is not difficult to find free granules in the conjunctival secretion, which, however, are never collected into such groups that they can be identified as belonging to the trachoma bodies.

Finally, I wish to note a third group of cylindrical epithelial elements, which are distinguished by granules which take the nuclear stain, and can be followed from the nucleus to the periphery, where, becoming more compact, they form sometimes a zone easily distinguished from the rest of the cytoplasm, sometimes a spherical mass which lies half within and half without the cell, as though about to escape from the cell.

That the intracellular bodies described by me in the normal conjunctiva have the same characteristics as the trachoma bodies, is evidenced beyond a doubt by their semilunar, oval, or triangular form, the brownish-violet to reddish-violet nuclear stain, the granular non-homogeneous appearance, the integrity of the nucleus and its membrane, and the distinct zone which separates them from the nucleus. There occur cells in which the nuclear membrane is ruptured, with expulsion of its chromatin masses, but these are never of such regular form as the bodies which are found in the epithelial cells with intact nuclei.

Before closing this communication I wish to state that I have had the opportunity of examining the normal conjunctiva of a macacus, in the same way as the human conjunctiva, *i. e.*, by scraping off the epithelium with a cover-glass. Although in lesser number, I found the usual hood-shaped, oval, triangular, and high-hat-shaped bodies, with distinct nuclear stain, and finely granular contents. Sometimes there can be distinguished the arrangement of the small granules in pairs, as if they were very minute diplococci, surrounded by the usual light areola. Likewise, there were present the so-called trachoma bodies of Greeff, adjacent to the nucleus, without a sharp contour, reduced to a heap of globules of intense reddish-violet color. Very uncommon are those cells in whose cytoplasm the granules occur, which, through the arrangement of the nuclear stain, are so characteristic in the human epithelium.

The presence of these bodies in the normal conjunctiva of the ape strengthens still more the above-mentioned view, that they can have no specificity for trachoma. Had Prowazek and Halberstaedter, before they tried to reproduce trachoma in the orang-outang, macacus, cynomalgus, and macacus nemestrinus, examined the normal conjunctiva of these animals, they would have seen these intra-epithelial structures, and have refrained from advancing the hypothesis of the chlamydozoa as the exciting agents of trachoma.

I can say nothing as yet about the real significance of these bodies, whether they are the products of the cell reaction against the toxic effects of the normal bacterial flora of the

conjunctival sac, or whether they are secretory or degenerative products of the epithelial cells, which are exposed to all sorts of physical, chemical, and microbic irritation.

In the last few days, as the present communication was almost completed, I have had the opportunity of reading Prof. Gallenga's monograph "On the specificity of the 'chlamydozoa' of trachoma" (*Annali di Ottalmologia*, anno 39, fasc. 1, 2), in which the author states that they are characterized by a blue color (by which they are distinguished from every heap of granules which can be found in the conjunctival epithelium, and which takes a reddish or violet or purple, never a blue, stain), and by the great variety of the form and dimensions of their granules, which are supposed to be larger than those found in the chlamydozoa-like forms which occur in gonococcal and non-gonococcal conjunctivitis, and which never occur in small heaps, as in the latter.

I would like to observe, here, that upon the color as a criterion much dependence cannot be placed, as Prowazek and Halberstaedter, themselves, have, with the Giemsa azure-eosin stain, described the above-mentioned granules in their communications as of a red or reddish-violet color ("Chlamydozoa," *Archiv f. Protistenk.*, vol. x., p. 335, 1907), of a red color (Zur Aetiologie des Trachoms, *Berliner klin. Wochenschr.*, 1909, No. 24), and even in their last monograph ("On the Significance of the Chlamydozoa in Trachoma and Blennorrhœa," *Berliner klin. Wochenschr.*, 1910, No. 15), they speak of the heaps of granules found in the urethral epithelium of men suffering from a non-gonorrhœal urethritis, as being of a dark red color. I need not mention, therefore, that others beside Mijaschita speak of a dark bluish-violet color, and Bertarelli and Cecchetto describe a pinkish-violet color, although they all use the same staining method. There is not much reliance to be placed upon the size of the granules, nor the size of the heaps built by them, as in the epithelium of the trachomatous conjunctiva there occur sometimes very fine granules (Fig. 9, Prowazek and Halberstaedter, "On the Etiology of Trachoma," *Berliner klin. Wochenschr.*, 1909, No. 24), sometimes large (so-called initial bodies of Lindner). The heaps of granules can be of varying extent, sometimes small (Figs. 1, 4, and 5 of the above-mentioned

work), sometimes large, and occasionally scattered throughout the entire cytoplasm.

It is desirable that Prof. Gallenga should make numerous scraped preparations of the normal human and ape's conjunctiva, and examine them carefully; in this way, he will be able to substantiate the existence of my findings and their great morphologic and tinctorial resemblance to the so-called trachoma bodies.

That there are differences between certain forms of intra-epithelial inclusions found in trachoma and other forms of conjunctivitis, as for instance in Figs. 2, 6, 7, and 9 of the above-cited work of Prowazek and Halberstaedter, or those shown in Figs. 1, 2, of the last paper of the same authors, and the structures found by me in the normal conjunctiva, is not surprising when one considers that in every inflammatory process the degenerative appearances, the reaction, and the secreting ability are considerably increased.

LITERATURE.

1. L. HALBERSTAEDTER and S. V. PROWAZEK. "On the etiology of trachoma." *Berliner klin. Wochenschr.*, 1909, No. 24.

2. S. PROWAZEK. "Chlamydozoa." *Arch. f. Protistenkunde*, vol. x., p. 335, 1907.

3. GREEFF—FROSCH—CLAUSEN. "Examinations on the occurrence and development of trachoma." *Arch. f. Augenheilk.*, vol. lviii., part 1, 1907.

4. *Ibid.* *Arch. f. Augenheilk.*, vol. lix., part 2, 1908.

5. *Ibid.* "On the observations of Prowazek." *Arch. f. Augenheilk.*, lix., part 2, 1908.

6. S. MIJASCHITA. "On the so-called trachoma bodies." *Klin. Monatsbl. f. Augenheilk.*, vol. 6, 1908.

7. BERTARELLI and CECCHETTO. "Contribution to the etiology of trachoma." *Zentralbl. f. Bakteriol.*, vol. xlvii., 1908.

8. C. ADDARIO. "On the significance of Prowazek's corpuscles and his blastomycetes of trachoma." *Progress. Oftalm.*, vol. v., 1910.

9. *Ibid.* "The pathogenic element of trachoma. New studies." *Arch. f. Augenheilk.*, vol. lxiv., 1909.

10. STARGARDT. *Heidelberg Ophthalm. Society*, 1908; *Graefe's Arch.*, vol. lxix., p. 525.

11. SCHMEICHLER. *Klin. Monatsbl. f. Augenheilk.*, 1908, vol. 6, p. 212; *Berliner klin. Wochenschr.*, 1909, No. 46.

12. AXENFELD. *Heidelberg Ophthalm. Society*, 1907, p. 97.

13. ROEMER. *Heidelberg Ophthalm. Society*, 1907 and 1908.

14. THIERFELDER. Rostock Dissert., 1909.

15. LODATO. *Eleventh International Congress of Ophthalm.*, Naples, 1909.

16. LINDNER. *Klin. Monatsbl. f. Augenheilk.*, 1908, vol. 6., p. 212; *Wiener klin. Wochenschr.*, 1909, No. 45.

17. ZUR NEDDEN. "On the significance of the trachoma bodies." *Arch. f. Augenheilk.*, 1910.

18. GUTFREUND. *Weiner klin. Wochenschr.*, 1909, No. 25.

19. REIS. *Ibid.*

20. HEIMANN. *Klin. Monatsbl. f. Augenheilk.*, 1909, No. 8, p. 338; *Deutsche med. Wochenschr.*, 1909, No. 39.

21. HERFORD. *Klin. Monatsbl. f. Augenheilk.*, 1909, No. 8, p. 225; *Ibid.*, 1908, No. 6, p. 92.

22. HALBERSTAEDTER and PROWAZEK. "On the significance of the Chlamydozoa in trachoma and blennorrhœa." *Berliner klin. Wochenschr.*, 1910, No. 15.

23. *Ibid.* "On Chlamydozoa findings in blennorrhœa neonatorum non-gonorrhoica." *Berliner klin. Wochenschr.*, 1909, No. 41.

CATARACT OPERATIONS AND THE PREPARATION OF THE SURGEON.

By W. E. McKECHNIE, M.B., Ch.B., Edin.,
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WHEN describing a special operation authors often begin with the heading "Preparation of the Patient." In a systematic description of operations for cataract I should be inclined to place first "Preparation of the Surgeon." By this preparation of the surgeon I do not mean that the surgeon should take an antiseptic bath, shave his head, and don a complete aseptic suit. These measures, I think, are uncalled for in a cataract operation and, whilst harmless in themselves, may possibly cause the surgeon to forget one or two little details which are the essentials upon which asepsis depends. In so delicate and precise an operation as that for cataract, anything which distracts the attention from the work in hand is to be deprecated. I have obserevd that the best operators in any operation are those who have the simplest technique, who devote their attention to what is strictly essential, and who are guilty of no fault of omission or of commission in any important detail. The operation for cataract is one which bristles with possibilities of committing both kinds of faults. I have learnt this not only from my own experience, but also from having had the privilege of watching a large number of operations done by men of varying degrees of skill, some of whom were learning to operate. It is by seeing beginners operate that one gets an insight into the essentials of an operation: after one has seen an expert do an operation a few times it is usually more instructive to watch beginners doing it. When watching the expert, for instance, one fails to notice that he does *not*

touch the eyelids with those parts of the instruments which he puts into the interior of the eye, but one quickly notices that the beginner ***does*** do so; and one experiences that feeling of horror and repulsion which all good surgeons should feel at the sight of such acts. If the perpetrator of the deed be rigged up in full aseptic panoply, and his assistant likewise, one realizes that such an one has spent time and energy upon things that do not really matter and has forgotten one of the little things that do.

So far as preparation of myself against sepsis is concerned all I do is to wash my hands in perchloride or other antiseptic lotion. I never touch with my hands that part of an instrument which touches the eye, and I endeavor to prevent it from touching the patient's eyelids. The wearing of a mask is a desirable precaution: if one does not wear a mask one must not speak over the patient's eye. This is all that is necessary as regards preparing the operator against sepsis; it will be noticed that the preparation is more one of the ***mind*** than of the person. Always in his subconscious self must the operator reiterate, even when in the throes of difficulties: "I must not foul my instruments."

My wish is not to flog this dead horse but to indicate other ways in which the surgeon should prepare himself for extracting cataract.

In cataract operations more than in any others it is desirable that the surgeon should feel fit. If the surgeon feels ill, or tired, he should not operate for cataract that day. In my own operating I have frequently noticed that I can operate better on some days than on others, and that sometimes I am quite unfit to operate. These bad days are usually ones on which I have taken quinine the night before, on account of having felt a little feverish. Until I came to recognize the bad effect it had upon me I used to operate in the morning although I had taken quinine the night before; the result was that I could not keep my hand from shaking; fine tremor ***would*** manifest itself when making the puncture and when seizing the iris for iridectomy. Although, by lightness of touch, one may neutralize to a great extent the harmful effect of fine tremor, it is disconcerting to feel that one has it, and this aggravates the nervousness which is

associated with the tremor, although one may not have been conscious of nervousness before beginning to operate. I have noticed that, even on my quinine days, the tremor is never as marked during subsequent operations as during the first and may, indeed, entirely disappear. The condition appears very often to be closely allied to what is known as "stage fright." It is well known that some of the greatest musicians, actors, and orators—people who must be well aware from past experience that their powers are equal to the occasion—are so afflicted with nervousness when they first appear before the audience that they find themselves almost paralyzed. It is always found, however, if once a beginning can be made, that the competent performer proceeds easily with his task. Unfortunately, in a cataract operation, it is the first step which is of supreme importance. It is no exaggeration to say that the whole subsequent course of the operation is made or marred by the incision. I do not mean to imply that it does not matter what one does after the incision is completed: far from it. But if the incision is wrong the operation will be a bad one; if the incision is exactly right it is comparatively easy to bring the remaining stages to a satisfactory conclusion. Thus whilst it will do no harm if the pianist sits blankly in front of his piano for five minutes, or the orator stares and stutters at his audience and halts at the beginning of his speech, it may imperil the success of a cataract operation if the operator attempts to operate when in a similar state of nervousness. It thus becomes important that the operator should guard himself as much as possible from all influences which may tend to make him nervous, such as things which may injure his health or cause undue excitement at the time of the operation. In the latter category come all those influences which may be classed under the generic name of stage fright. Individuals differ so much in the matter of "nerves" that each one must find out what is best for himself; but there is no doubt that a set public performance before strangers has a most disturbing effect on the nerves of many men; and indeed it is often some of the best performers who are so troubled. When we see that great artists, whose business in life is to perform in public, may be afflicted with stage fright when facing

their audiences for the first time when only their own well-established reputations are momentarily at stake, it is evident that the matter may be worse in the case of a surgeon who, in front of a critical audience, has at stake not only his own reputation but the welfare of his patient's eye. It is sometimes necessary for the progress of the art of surgery that such demonstrations should be given; if the surgeon be afflicted with nerves under these conditions he should either decline to operate, or he must prepare himself for the ordeal in such a manner that his nervousness may be overcome. In a discussion on stage fright in the *British Medical Journal* (1) instances were given of the various methods different people resort to in order to overcome it, and whilst I would not advocate strong doses of alcohol—Dutch courage—such as some people have used (I have heard of a well-known surgeon who always operated best when under the influence of alcohol), yet I am of opinion that the cataract operator, if nervous, should steady himself by some means, not only when the nervousness is due to such a very special cause as a public demonstration, but when suffering from that nervousness which in ordinary circumstances may afflict a beginner, or even an expert if he be out of practice or not in good health.

There are two kinds of unsteadiness, which differ in degree. One leads to a gross vibration of the point of the knife, the amplitude of which may be measured in quarters of an inch. This form usually afflicts the mere beginner; but it might affect the competent man who is suffering from some temporary indisposition. On no account should the operator begin the operation if such unsteadiness manifests itself. No considerations should outweigh the consideration of the manifest danger to the patient's eye of attempting the incision when the hand is so unsteady. Yet I have seen it done; and I have also seen the subsequent irido-dialysis when the iris forceps, vibrating in the left hand, had at last entangled itself in the iris. Should the operator exhibit such a condition, if a beginner, he must abandon the thought of doing cataracts for the time being, and serve an apprenticeship at other operations before attempting cataract again. There are plenty of operations on the lids and other parts of the body, in which, without doing serious harm to his patients,

the young surgeon may acquire manual dexterity and steadiness: by doing these operations he will either acquire the dexterity he should possess before venturing on cataract, or he will ascertain that he is not constitutionally adapted to be an operator on such a delicate and movable organ as the eye. If from any cause gross unsteadiness affects a competent man, he must recognize that this is not his day, that he is unfit to operate, and he must abandon the operation. This should be an absolute rule: there may be great temptation to break it, but it should not be broken.

The other kind of unsteadiness shows itself as a fine tremor, not a gross agitation as in the previous case. It is not an absolute bar to operation. I have frequently done cataracts although suffering, at the outset, from fine tremor, and I have completed the operations successfully; still I cannot say that I feel that I do the operations as satisfactorily when in this state as when I am in a more normal condition.

Fine tremors may have various causes, such as stage fright, ill-health, or the taking of drugs like quinine; it is particularly liable to occur when one is out of practice; after a break of a few weeks in one's operating work one is liable to suffer from tremor on resuming it again. I have suffered from tremor when operating under difficulties, as when I have operated in an unsuitable room with bad light, or with the help of an untrained assistant.

In order to prevent as much as possible the occurrence of unsteadiness an operator should keep himself in the best of bodily health. He should not indulge in a banquet, or sit up too late, on the night before the operation. He should wake hale and fresh in the morning after a good night's sleep. Too much work, want of sleep, mental worries, are all of them liable to lessen the dexterity of the operator and to prejudice his skilful execution of the operation. Temperaments of course differ, and what one man can do without impairing his finer perceptions and powers another cannot, but as a general rule the best preparation for enabling one to do a cataract operation to the best of one's ability is to attain the *mens sana in corpore sano*.

For unsteadiness due to such causes as stage fright or want of practice a remedy is desirable; putting off the operation

will not get over unsteadiness due to want of practice. I would therefore suggest that if an operator finds that he is suffering from fine tremor and nervousness when he takes up his knife to operate, whatever may be the cause, it would be advisable for him to lay it aside for a few minutes and to try the effect of taking some sedative. A few drops of a diffusible drug such as ether taken in a wine-glass full of water may be tried; if this does not cure the stage fright a powerful remedy is a hypodermic injection of 0.008*gm* of morphine. Such drugs act within a few minutes so that there need be no inconvenient delay in proceeding with the operation whilst the surgeon will regain his usual steadiness and *sang-froid:* these are the kinds of remedies used by the public speakers and others previously referred to. Each surgeon must find out the best remedy for himself; if he ever suffers from shakiness he should seek a remedy and not ignore the condition from any sense of shame, or from fear that he might be thought by others to be incompetent. The most competent men are liable to suffer from this sort of nervousness. I am a very firm believer in having a quiet patient for a cataract operation, and I am an equally firm believer in having a quiet surgeon; just as a surgeon may find it desirable to quiet his patient by a sedative, so it may be almost equally desirable that he should quiet himself.

For cataract operations the surgeon should acquire a delicate and light touch associated with a somewhat loose grasp of the knife or other instrument which enters the eye. If the knife be delicately poised and held lightly, then a slight tremor will not matter much, and should any untoward movement of the patient take place there is less likelihood of damage being done than if the grip had been more rigid. I would rather see an incision made by a lightly held and delicately balanced knife even though there were a slight amount of tremor, than I would see a hand as steady as a rock but gripping the knife tightly and rigidly. I may describe a case of mine as an instance of what I mean.

On February 26, 1910, I operated on an Indian native male, Surdu, 80 years of age. Four months previously he had had a blow on the left eye, having been butted by a bull. The condition when first seen on February 26, 1910, showed

the remains of a dislocated lens lying free in the anterior chamber; it consisted of the nucleus, the rest of the lens matter having become absorbed; it was about 5 or 6*mm* in diameter and about 2 or 3*mm* thick; there was a slight amount of iritis, but not more than was to be expected from the irritating presence of the loose lens, which floated about in the anterior chamber, changing its position with changes in the position of the patient's head; there was bare perception of light and the patient complained of a good deal of pain in the eye: it was for the pain that he desired treatment. There was no synechia, the pupil was central, and the anterior chamber fairly deep.

Under cocaine anæsthesia I proceeded to make a radial incision corresponding to the old linear extraction incision of von Graefe. This incision was chosen because it conformed to the requirements of a good incision (?) and because with a less peripheral incision it would have been difficult to avoid impaling on the point of the knife the lens lying in the anterior chamber. As it happened, just before I was about to make the counter-puncture the knife did touch the lens, pushing it a little; the effect was instantaneous and unexpected. The patient yelled and rose right up into a sitting position; before he was half-way up I had withdrawn the knife; his iris was evidently in a very sensitive condition from irritation; the slight pressure on it caused by my knife moving the lens was the probable cause of p naisufficient to produce this outburst. It was with difficulty that, knife in hand, I succeeded in pacifying the patient and inducing him to let me have another try; at last I got him to lie down again, and, very little aqueous having been lost, I cautiously introduced the knife through my former puncture. As the point of the knife was about to make the counter-puncture the patient again rose up, and again the knife was withdrawn. A third attempt succeeded (through the same puncture), the cut this time being completed despite some struggles on the part of the patient who was held down. But by this time the aqueous was all lost and the lens would not move in the anterior chamber. A spoon was therefore introduced, but directly it got under the lens the patient rose up on the table again and the spoon was withdrawn just as it was on the

point of extracting the lens. I then applied some stronger measures of persuasion to the patient than I had hitherto employed, and, these enabling him to regain his self-control, the spoon was introduced a second time and the lens extracted without further trouble. The man was relieved of pain and the subsequent history w s uneventful. Now I come to my point: during these adventures there was no apparent damage done to the iris, or to the cornea, or to the loose lens, and there was so little aqueous lost after the first two introductions and withdrawals of the knife that I was able to make and complete the incision at the third attempt; this I think remarkable considering the violent movements of the patient, from which one might at least have expected an enlarging of the wound and loss of aqueous, if not an irido-dialysis or worse. That these things did not happen I attribute to a loose and delicate grip of the knife; in this lies safety. Had I held the knife rigidly I think the eye would have certainly been damaged. I would suggest then that one who is about to become a cataract operator should study the method of holding the knife and other instruments. Lightness combined with firmness and proper balance is what is required. An artist when sketching with a pencil seems to have the sort of grip required. Frequent handling of the knife and other instruments, and operations on the cadaver or on animals, will help to give the requisite manual education. Metal-handled knives should not be used; they are clumsy and slippery, and have not got the proper weight or balance. I should like to see the "Aseptic Metal Handle" finally abolished for cataract knives. There is nothing I know of to equal the ivory-handled knives of a shape and size such as are made by Weiss of London: they give balance, delicacy, and a pleasant, firm grip; the metal handle has to be more tightly grasped to get the same amount of firmness. It is not necessary to boil a cataract knife in order to sterilize it. To confine oneself to metal handles for the sake of being able to boil the knives is to lose the substance in order to grasp at the shadow (3).

When we come to the attainment of skill in actual operating the young surgeon has a difficult task before him. It is to be feared that a certain number of human eyes must be

sacrificed in the training of every cataract operator. I do not say that the eyes need necessarily be absolutely lost, though even this may happen through the operator's want of experience and skill: but it is certain that the making of every accomplished operator entails more or less misfortune to a certain number of human eyes. One cannot gain skill and experience in cataract operations without doing less than the best. I will illustrate this by a case from my own experience. It occurred whilst I was undergoing my apprenticeship to Major Smith at Jullunder. It happened, at the time, that I was under the influence of quinine, and to add to my troubles I had as spectator a distinguished stranger. My hand was shaky, and although I completed the incision correctly I was in an overstrung condition. The iridectomy was properly done and then I proceeded to express the lens in its capsule. When the lens was nearly three quarters delivered and I was on the point of hooking it out a bead of vitreous appeared beside it and threatened to burst. Instead of doing what I should have done, what I should do now, and perhaps what I would have done then had my nerves been steadier and my judgment unperturbed, instead of doing the right thing I did the wrong. I suddenly lifted my hook to relieve all pressure from the eye, with the result that the lens, which was more than half delivered, dropped back into the eye with sufficient impetus to become buried in the vitreous. Neither I nor Smith was able to extricate it from its semi-couched position, and the operation had to be abandoned as a failure. Thus was an eye almost certainly lost which greater skill and judgment on my part would certainly have saved: yet though at the time I was a learner and was being taught by Smith, I was only relatively a beginner; from one point of view I might have been regarded as an expert; I rather think that was my own point of view, for I had done over three hundred successful extractions in the capsule before this happened. He who proposes to himself to become an operator on cataract should realize that by the time he becomes the finished product he will represent a certain number of human eyes more or less destroyed; if he does not agree with this dogma I would ask him to read Colonel Herbert's (4) admirable book on cataract,

and, having done so, to ask himself whether he is prepared to face all the difficulties and complications therein described with confidence that he will always be able to surmount them in the safest manner. The best way for the beginner to learn, the best way for himself and the safest for the patients, is to operate in the presence of a master who stands by ready to give help if needed, and who warns his pupil against errors of technique as occasion arises. It is thus that workmen are trained in skilled trades. Cataract operating does not require as much dexterity as is shown by many artisans who are specially skilled in their own line. But the difficulty about cataract is that there is so little material available to train the apprentice upon. On the one hand the master feels that, good as he himself is, he would like just a little more practice and experience and so prefers to do the operation with his own hand, giving to the apprentice the privilege of *looking on:* and on the other hand the apprentice, when he *does* get a chance, has, *ille ipse*, to pose as a master who knows all about it for fear his material should lose confidence, take fright, and run away!

It thus happens that, as a rule, the cataract operator instead of being properly taught has to find out how to operate for himself. The method is a slow one, and it is expensive in eyes. A man may go on making mistakes and never know he is making them. I have mentioned my own experience of this in previous papers (5). Others have had the same experience (6). For the sake of the efficiency of operators, and for the sake of the patients, I would suggest that it should be a rule in large eye clinics with consulting staffs that a certain percentage of the cataracts, say 20%, should be reserved for the junior staff, to be done by them under the immediate supervision of such of the senior members as were specially skilled in cataract operating. Such a system would produce greater efficiency all round and would minimize the loss of eyes. Many an eye would be rescued by the skilled senior, and a junior would not continue in a faulty technique without being made aware of it.

REFERENCES.

1.—*British Medical Journal*, June 5, 1909.

2.—McKechnie, ARCHIVES OF OPHTHALMOLOGY, May, 1909.
3.—Landolt, *British Medical Journal*, 1907, vol. ii., p. 1212.
4.—Herbert, *Treatise on Cataract Extraction*, 1908.
5.—McKechnie, *Ophthalmic Record*, Feb., 1910.
6.—Birdwood, *Ophthalmic Record*, Feb., 1910.

ENLARGEMENT OF THE BLIND SPOT, AN EARLY SYMPTOM IN THE DIAGNOSIS OF OPTIC-NERVE AFFECTIONS, DUE TO DISEASE OF THE POSTERIOR NASAL ACCESSORY SINUSES.

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Translated by Dr. Alfred Braun, New York.

(*With Text-Plates III.–V.*)

A YEAR ago, I described a case of disease of the posterior nasal accessory sinuses, in which the first symptom of the resultant optic-nerve affection was an enlargement of the blind spot. While this report was going to press, I saw two more patients with this disease, who showed the same symptom, and whose histories I will briefly narrate.

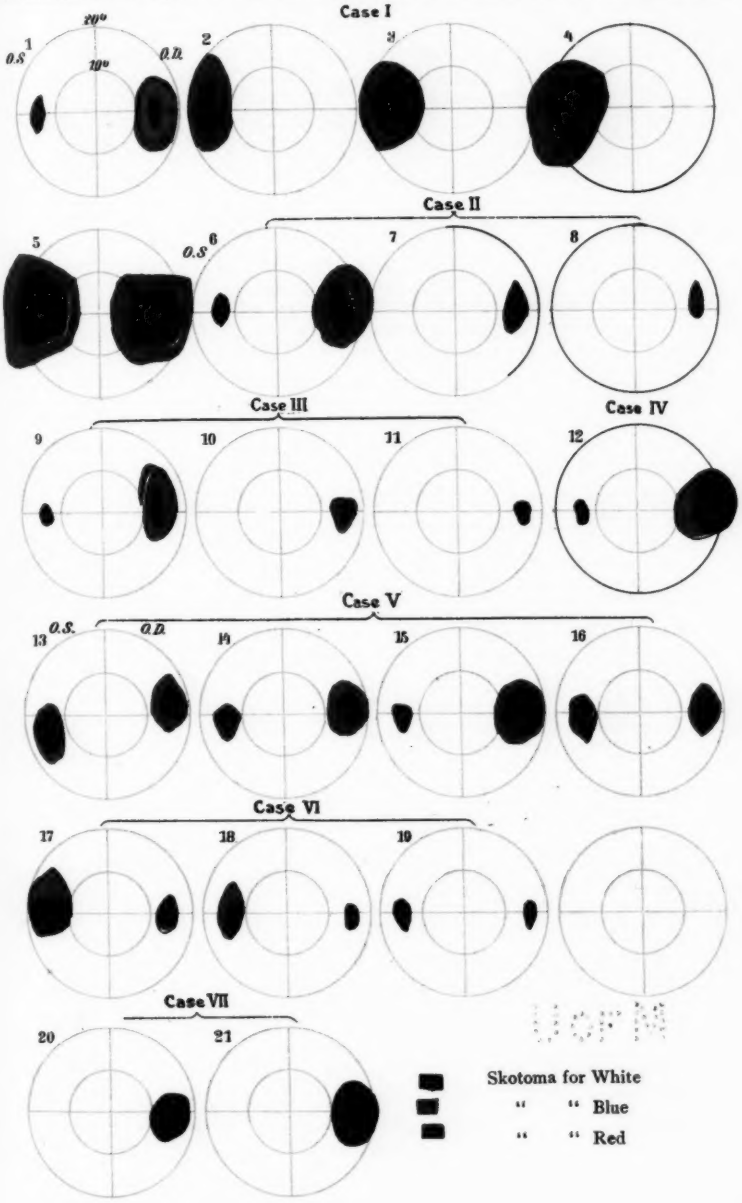
At that time I stated that it would be necessary to study many of these cases, in order to determine whether the demonstration of this symptom is of importance for the diagnosis of this disease, or not. Now I believe that I have observed enough of these cases to answer this question in the affirmative.

In addition to the case already described, I was in the position to examine six cases of disease of the posterior nasal accessory sinuses, of which the histories follow. A short history of Cases 1 and 2 has already been given in my previous communication.

Case 1.—R., who was sent to me by a rhinologist, has had, for six weeks, severe pain in the head and at the lower margin of the right orbit. Pressure of the eyeball against the orbital roof was very painful. Movements of the eye caused pain behind the eye.

In 1905, upon being examined for military duty, the vision of both eyes was $\frac{6}{6}$; lately, the vision has become worse. There was pus in the nose, of which it was im-

TO ILLUSTRATE DR. J. VAN DER HOEVE'S ARTICLE ON ENLARGEMENT OF THE BLIND SPOT.



possible to determine the source. On March 10, 1909, there was slight exophthalmos of the right eye, with slight limitation of mobility in all directions, so that there was diplopia when the eyes were directed laterally.

Figs. 1–5, Plate III., show the scotomata which were present. All the figures show the central portion of the visual field, extending 20° to each side. The scotomata for white are indicated in black, and those for the various colors, each by its own color. When the scotoma for one color is greater than that for another, only that portion of the larger scotoma which extends beyond the margin of the smaller one is indicated.

On March 18th, the blind spot of the left eye was normal in size (Fig. 1, O. S.), and that of the right eye, enlarged for colors, greater for red than blue (Fig. 1, O. D.). On March 19th (Fig. 2) the blind spot in the left eye was decidedly enlarged for white, still more enlarged for blue, and most for red and green. Fig. 3 shows the scotomata of the left eye on Macrh 21st, Fig. 4 on March 22d. Fig. 5 shows the scotomata of both eyes on March 29th. The scotoma of the right eye has extended in the same way as that of the left eye. For a long time after that, the scotomata remained of the same size.

As soon as the enlargement of the blind spot was determined, an X-ray picture of the head was taken, and this showed the posterior nasal accessory sinuses of the right side to be much darker than those of the left side, so that we were able to make a probable diagnosis of disease of the right posterior sinuses.

The vision, which on March 18th was down to $\frac{1}{2}$, dropped to $\frac{1}{4}$. The fundus was normal in both eyes. There was a slight peripheral contraction of the visual fields for color. There was no central scotoma.

The patient refused operation on the nose. In February, 1910, I visited the patient at his home, and found that his vision had diminished still further, and that there was still purulent discharge from the nose. He was unable to do his work. There was now a central scotoma for colors in both eyes, resulting in bitemporal hemianopsia for colors.

Case 2.—V. D. B. had nasal catarrh three weeks ago, followed by pain behind the right eye. The right side of the nose is obstructed. The patient cannot smell. There is a deviation of the nasal septum to the right. There is a purulent discharge from the right side of the nose. There is inflammation of the right posterior ethmoidal cells.

On June 2, 1909, V.O.D.=$\frac{1}{4}$. Fundus normal. The blind spot is enlarged for white and blue, and still more for

red and green (Fig. 6), while in the left eye the blind spot is of normal size (Fig. 6, O. S.). There is no central scotoma. After cocain and adrenalin were applied to the nasal mucosa, there was free drainage, and two days later the scotoma for white was almost normal, and for colors decidedly smaller than before (Fig. 7).

On June 5th, the blind spot is normal (Fig. 8). July 2d, the nasal condition has not recurred, and the fields of both eyes have remained normal.

CASE 3.—K. has severe inflammation of the right posterior ethmoidal cells, with intense headaches. On Jan. 4, 1910, the blind spot in the right eye is enlarged, more for red than for white, and most for blue (Fig. 9); in the left eye the blind spot is very small.

After removal of the middle turbinate, there was a discharge of muco-pus from the ethmoidal cells, and the inflammation soon subsided. After the operation, the scotomata rapidly diminished in size, so that on Jan. 8th, they were as in Fig. 10. On Jan. 18th, the right blind spot was again normal in size, but yellow was seen as green, in the region where the scotoma was. On Jan. 23d, the scotomata are normal (Fig. 11). On Jan. 4th, V.O.D. = $\frac{1}{3}$, V.O,S. = $\frac{1}{2}$. On Jan. 8th, V.O.D. = $\frac{3}{4}$, on Jan. 18th V.O.D. = $\frac{5}{7}$ —, and on Jan. 23d, V.O.D. = $\frac{1}{1}$. The fundus was normal during the entire disease.

CASE 4.—The patient, X., has an empyema of the antrum of Highmore. V = $\frac{1}{1}$ in both eyes. The blind spot is normal in the left eye, and enlarged for white and colors in the right eye (Fig. 12). Fundus is normal.

The antrum was opened, and pus, which was under considerable pressure, evacuated. After healing of the empyema of the antrum, I was unable to examine the patient, but was informed by Dr. Duuring von Herzogensbusch, who examined her, that the blind spot of the right eye was normal, and of the same size as that of the left eye.

CASE 5.—B. has been suffering from bilateral nasal polypi for three years. He has never had any ocular trouble. On Nov. 25, 1909, V.O.S. = $\frac{1}{1}$, V.O.D. = $\frac{1}{1}$. On the capsule of the left lens there are pigment patches. The eyes are emmetropic.

There is temporal pallor of both disks. Both blind spots are normal for white, and slightly enlarged for colors. After removal of the polypi there is to be seen in the nose, pus, whose origin it is impossible to determine. X-ray examination shows no difference in the two sides.

On Dec. 24th, V.O.S. = $\frac{3}{4}$, V.O.D. = $\frac{5}{5}$. The temporal pallor of the disks is more marked than on Nov. 25th. The veins are slightly dilated and dark. Both blind spots

TO ILLUSTRATE DR. J. VAN DER HOEVE'S ARTICLE ON ENLARGEMENT OF THE BLIND SPOT.

Fig A

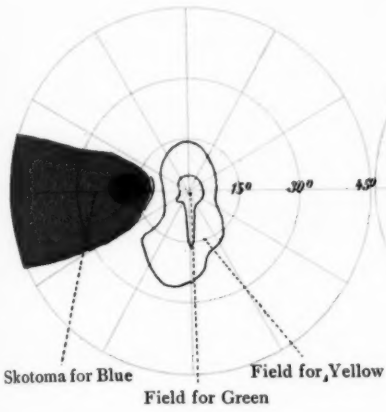


Fig B

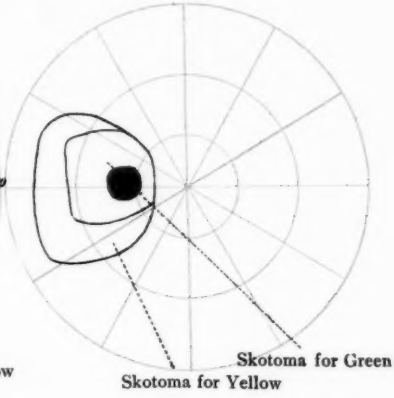


Fig. C.

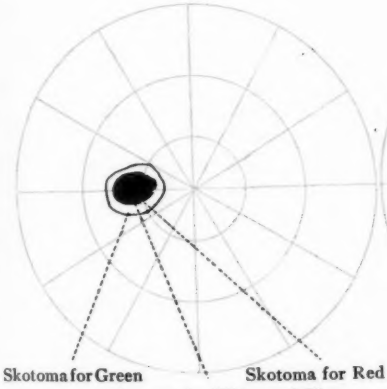
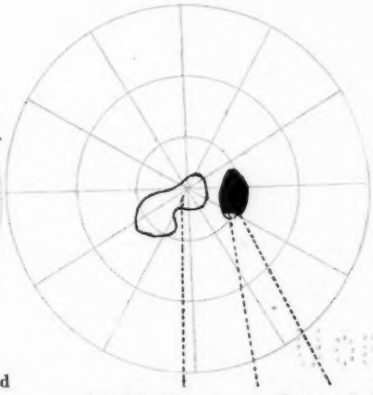


Fig. D.



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are enlarged for white and still more enlarged for colors (Fig. 13).

On Jan. 5th, V.O.S. = $\frac{3}{4}$, V.O.D. = $\frac{5}{6}$. The scotomata are somewhat larger. On Jan. 6th, the left posterior ethmoidal cells were opened, and it was seen that their mucous lining was the seat of polypoid degeneration. On Jan. 7th, the scotoma for white and colors in the left eye was decidedly smaller, while in the right eye it had increased in size (Fig. 14).

On Jan. 9th, the left sphenoidal cavity was opened, disclosing polypi, which were removed. On Jan. 10th, the blind spot in the left eye was almost normal. In the right eye, the scotoma is still increasing (Fig. 15). On Jan. 14th, the right sphenoid was opened, and found normal. On Jan. 15th, the scotomata were the same as on Jan. 10th. On Jan. 16th, the right ethmoidal cells were opened, and their polypoid contents removed. V.O.D. = $\frac{5}{6}$, V.O.S. = $\frac{3}{4}$.

Since then, the scotoma in the right eye has become smaller, but has not reached the normal. On Feb. 1st, the scotomata were as shown in Fig. 16. That of the left eye had again increased in size. When the rhinologist was informed of this fact, he told me that the polypi had recurred on the left side, thus accounting for the enlargement of the scotoma. Thus it was possible in this case to observe that, after the operation on the left accessory sinuses, the scotoma in the left eye became smaller, after the operation on the right sinuses, the scotoma in the right became smaller, and upon a recurrence of the nasal condition on one side, the scotoma on that side became larger.

Case 6.—Z., 14 years of age, has disease of the right posterior ethmoids. On Dec. 30, 1909, V. = $\frac{5}{6}$ in both eyes. The blind spot in the right eye is not enlarged for white, but enlarged for colors, below, while in the left eye it is decidedly enlarged for white and colors (Fig. 17). Fundus is normal in both eyes. After the middle turbinate was removed, there was a free discharge of muco-pus from the ethmoidal cells.

On Jan. 5th, the enlarged scotoma for colors in the right eye had disappeared, and the scotoma for white, which was not very large, had become even smaller. In the left eye, the scotoma for white and for colors had become decidedly smaller (Fig. 18). On Jan. 22d, the scotomata are normal (Fig. 19).

Case 7.—G. was examined for military duty on Oct. 14, 1909, and had at that time V. = $\frac{5}{6}$, with good central color perception. On Jan. 10, 1910, he complains that

he does not see as well with his left eye. On examination he shows V.O.D. = $\frac{1}{4}$, V.O.S. = $\frac{1}{10}$. He is emmetropic.

In the left eye, although difficult to determine, it is found that the blind spot is considerably enlarged. In the right eye it is also enlarged (Fig. 20). His color perception is so poor on both sides that the color fields cannot be determined. There is marked temporal pallor of both disks.

Patient had no nasal symptoms, but upon examination by Dr. van Leent, a rhinologist, he was found to have a marked septal deflection to the left, with both nasal fossæ full of pus. An X-ray picture shows the left ethmoidal region to be darker than the right.

The patient refused nasal operation.

On Jan. 15th, V.O.D. = $\frac{1}{4}$, V.O.S. = fingers at one metre. Ther ewas decided enlargement of the blind spot (Fig. 21).

In this case there was a central color scotoma, with enlargement of the blind spot for white, in both eyes.

In spite of the fact that vision diminished so rapidly, both the patient and his father refused nasal operation.

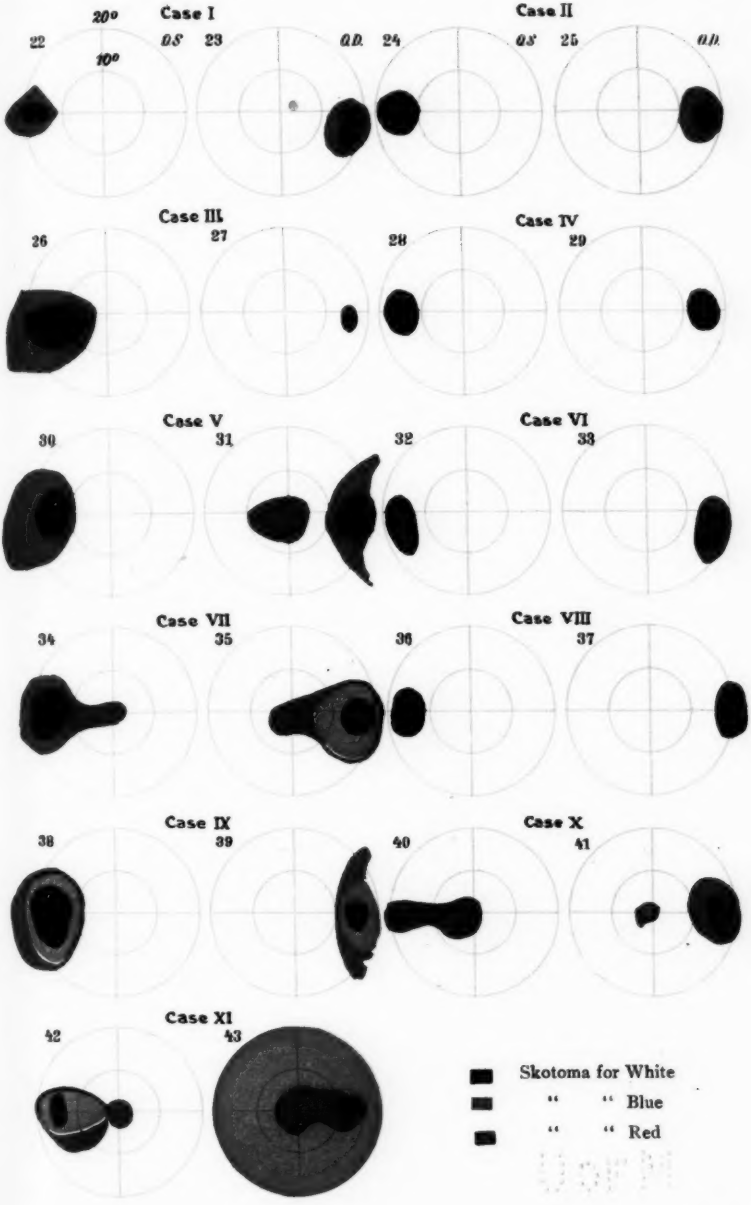
In every one of my cases of disease of the posterior nasal accessory sinuses, there was enlargement of the blind spot.

The peripheral limits of the fields were normal in all seven cases, with the exception of the slight limitation for colors in Case 1.

If we examine these cases more carefully, we see that there are six cases of disease of the posterior nasal accessory sinuses, and one of disease of the maxillary antrum; in four cases (1, 5, 6, and 7), the optic-nerve affection was bilateral, this being due in Case 5 to bilateral accessory-sinus disease. In Cases 1 and 7, the X-ray examination showed the sinuses to be darker on that side in which the optic nerve was earlier and more markedly involved.

Since in these two cases there was no operation performed, it is uncertain whether only one side was diseased, as X-ray photographs, although excellent diagnostic aids in accessory sinus disease, give us by no means positive evidence. In the first place, all cases of accessory sinus disease do not throw a shadow on the photographic plate (as in Case 5), and secondly, as our information is obtained by comparing the two sides, in cases where one side is darker than the other it is sometimes impossible to say whether only one side is

To Illustrate Dr. J. Van der Hoeve's Article on Enlargement of the Blind Spot.



diseased, or whether both sides are diseased, one side more than the other.

Case 6 is interesting, because here, with right-sided ethmoidal disease, the left optic nerve was more involved and recovered later than the right. We have here a crossed affection, as Onodi explains with his anatomical preparations.

Pain in the depths of the orbit upon ocular movements occurred only in two of the patients (Cases 1 and 2), which is in accord with Uhthoff's statement: "When ocular movements are painful, we are justified in assuming that the inflammation lies close behind the eye." In our cases, the disease was probably located far behind the eye, in the region of the optic canal.

Ophthalmoscopic examination showed no changes, except a temporal pallor of the disk in Cases 5 and 7.

The enlargement of the blind spot for colors was usually of such a character that red and green showed the largest scotomata, blue smaller, and white the smallest (Cases 1 and 2). In some cases, however, the scotoma for blue was as large as that for red, and occasionally even larger (Case 3).

Green is not well adapted for the examination, as the results of repeated examinations varied, whereas the results for red, blue, and white were constant. Therefore deductions were drawn only from the scotomata for red, blue, and white.

In Case 1, the scotomata in both eyes neared the fixation point for some time before a central scotoma appeared. In this way there arise scotomata which gradually enlarge to hemianopsia.

All of the cases in which the nasal condition was treated improved considerably, or were entirely cured. Case 5 showed, after the operation, marked reduction of the scotomata, which became enlarged again, upon a recurrence of the nasal condition. Cases 2, 3, 4, and 6 were entirely cured. In Case 3, vision increased from $\frac{1}{3}$ to $\frac{5}{5}$. The untreated cases (1 and 7), on the contrary, showed rapid increase of the scotomata, and reduction in vision, so that neither patient could attend to his work.

In Cases 2, 3, and 4, the non-affected side showed no optic-nerve involvement. This fact, and the excellent results of the treatment directed toward the accessory sinuses, make

it very probable that the optic-nerve involvement is caused by the nasal accessory-sinus disease. The disease in the accessory sinuses may be inflammation with pus formation, or hyperplastic inflammation of the mucous membrane.

Schieck believes that the optic-nerve involvement depends less upon the severity of the process in the ethmoidal cells than upon a venous stasis in the region of the bony canal, which, in the presence of certain anatomical conditions, as a result of œdematous swelling of the periosteum and nerve sheaths, causes an interruption of the optic-nerve impulses.

As far as the nasal treatment is concerned, it was only necessary, in some of our cases, to allow good drainage to the pus or muco-pus, in order to cure the disease, while in others it was necessary to remove the diseased mucous membrane of the cavity. Case 2 shows that operation is not always necessary to cure the nasal condition, as is also mentioned by Jung, and also that the local blood-letting, occasioned by the operation, is not necessary to obtain a cure.

Professor Koster had the kindness to submit to me, for this communication, two cases from his private practice, which show that after opening the accessory sinuses optic-nerve affections can improve very rapidly.

CASE 1.—H., 38 years of age, had been treated since May, 1909, for left optic atrophy, and beginning right optic atrophy. The disease had progressed, in spite of abstinence from tobacco and alcohol, and the administration of potassium iodide.

When Prof. Koster first saw the patient, on June 23, 1909, V.O.S. = $\frac{1}{60}$; V.O.D. = $\frac{4}{5}$. Emmetropia. There was pallor of the temporal third of the left disk. In the right the pallor was less marked. The vessels showed but slight changes. Examination of the fields showed bitemporal hemianopsia, as well as some abnormality of the nasal portion of the fields. There was no central scotoma. There were no symptoms of brain tumor. There was nasal trouble, with marked discharge, which had stopped shortly before.

Prof. Kan, the rhinologist, opened the ethmoidal and sphenoidal cells on both sides, disclosing swelling of the mucous lining of these cavities.

On June 29th, V.O.S. = $\frac{1}{60}$ excentrically. V.O.D. = $\frac{4}{4}-$. The patient received proto-iodide pills, and rest was advised.

On Oct. 11th, V.O.S. = $\frac{4}{8}-$, V.O.D. = $\frac{4}{4}$. There is still bitemporal hemianopsia, but the nasal fields are normal.

CASE 2.—B., 22 years of age, came under treatment Feb. 18, 1910, on account of diminishing vision in the right eye for a week, following a cold. The rhinologist had washed out the right antrum, which even now showed darker than the left, upon transillumination. The right middle turbinate is somewhat larger than normal. The patient discharged many crusts from the nose. On Feb. 18th, V.O.S. = $\frac{4}{4}$, V.O.D. = $\frac{1}{20}$. There is temporal light projection. Both disks are hyperæmic. The arteries are small, and in the left eye the veins are dark.

Diagnosis.—Acute retrobulbar neuritis. The blind spot of the left eye is enlarged for white (about 9°). There is no central scotoma, but here red is seen as orange. There is a scotoma for blue, which surrounds the blind spot, and whose temporal limitations cannot be determined. Green and yellow are recognized only in small areas about the fixation point. Red is not seen anywhere. In the centre it is called orange (Fig. A, Plate IV.).

(Figures A, B, C, and D show the central portions of the fields, up to 45° to all sides of the fixation point.)

Between Feb. 19th and 22d Prof. Kan opened both sphenoidal and ethmoidal cells, disclosing a swelling of the mucous membrane. Soon after, the patient noticed an improvement.

On Feb. 23d, the field in the right eye showed nasal hemianopsia, the blind spot in the temporal field being enlarged to 10°. Colors are not yet recognized. V.O.D. = $\frac{0}{5}\cdot\frac{0}{0}$, excentric. The visual field of the left eye has improved decidedly (Fig. B). The scotoma for red and blue has been reduced to a small peripapillary scotoma. Green and yellow show large peripapillary scotomata. Rest was advised for two weeks, and sodium salicylate prescribed.

On March 11th, V.O.S. = $\frac{4}{4}+$; V.O.D. = $\frac{4}{8}+$. Central color sense is good on both sides, but in the right eye it is still weak for yellow (with a 1*mm* square at a distance of 1 metre).

The peripheral limits of the fields are normal. The blind spot in the left eye has become decidedly smaller for red and green, but is still larger than normal (Fig. C). In the right eye (Fig. D), it is too large for blue, red, and yellow, while the field for green extends only a short distance about the fixation point.

In these cases. the scotomata, as shown in the figures, were peripapillary scotomata. In the first case, this could

not be determined, on account of the bitemporal hemianopsia. In both cases, the vision was decidedly improved after the opening of the accessory sinuses. Although in the second case, the vision in the left eye was yet $\frac{1}{4}$, the optic nerve was already markedly involved, especially the peripapillary fibres, as is shown by the visual field.

Before we can decide that the symptom of enlargement of the blind spot has any value in the diagnosis of disease of the posterior nasal accessory sinuses, we must find out whether this symptom does not occur in other nasal diseases.

For this purpose, a number of patients were examined by me, with disease of the frontal sinus, antrum of Highmore, ozæna, and other nasal diseases, kindly placed at my disposal by Dr. van Leent, or examined by him for me.

In all these cases, normal blind spots were found for white and colors, except in the above-described Case 4, which differed from the ordinary empyema, however, in that the pus was confined under great pressure, so that on opening the cavity, the pus spurted out. It is probable that the collection of pus under such high pressure caused œdema and circulatory disturbances over a greater area than is usually the case in this disease.

In more than 50 persons without nasal or ocular disease whom I examined, normal blind spots were found. The scotoma for colors is slightly larger or the same size as that for white, in normal persons. Case 6 shows that the absolute size of the scotoma is not diagnostic, but that we must follow its course, as in this case the blind spot for white in the right eye was not large, yet after healing it was shown that the normal spot in this eye was still smaller.

This symptom can be considered positive, only when (1) the scotoma for colors is decidedly larger than that for white, or (2) the extent for white and colors is decidedly greater than normal, or (3) the size of the scotoma changes in the course of the disease.

In the case previously described by me, there occurred, soon after the recognition of the enlargement of the blind spot, a central scotoma, and both scotomata became enlarged, until they touched, for colors. Whether this was also the case in Cases 1 and 7, or whether here the color

scotomata spread out over the entire visual field from the blind spot, cannot be decided, as the patients were not under observation during the appearance of the central scotoma.

Cases 1 and 5 show that not always, as in the previously described case, does a central scotoma appear soon after the enlargement of the blind spot. The enlargement of the blind spot can exist for a long time as the only defect in the visual field.

De Kleyn, who investigated this symptom in many cases of nasal disease in the University Clinic for Ear, Nose, and Throat Diseases in Utrecht, obtained similar results. In all of the cases examined by de Kleyn, with disease of the nose, frontal sinus, and maxillary antrum, without disease of the posterior accessory sinuses, the blind spot for white and colors was normal. In 52 cases of posterior accessory-sinus disease, he found enlargement of the blind spot for white or colors 47 times. Together with my 7 cases, in 59 cases of posterior ethmoiditis or sphenoiditis, this symptom was found 54 times, whereas in disease of the anterior sinuses or nasal disease, it occurred in only one patient (Case 4).

The nasal treatment caused a decided improvement of the eye symptoms in all the cases, in most of the cases even a complete cure.

From these facts, we can draw the conclusion that enlargement of the blind spot for white or colors occurs as a result of nasal disease only when the posterior accessory sinuses are diseased, and that it is an almost constant and the earliest ocular symptom in these cases. Since, therefore, in almost all cases of disease of the posterior nasal accessory sinuses this symptom, which we will call peripapillary scotoma, occurs—that is, there is an involvement of the optic nerve, it seems that the close relationship between the accessory sinuses and the optic nerve, which Onodi was able fairly often, yet only in exceptional cases, to show in his anatomical preparations, is not necessary for the occurrence of optic-nerve involvement. Probably in those patients who have the anomalies shown by Onodi, the most severe optic-nerve involvements occur.

It follows from our observations, that we must agree with Shieck, when he says that Birch-Hirschfeld goes too far,

perhaps, in claiming that only the presence of central scotoma justifies the diagnosis of retrobulbar neuritis due to nasal accessory-sinus disease, and that other defects in the visual field are of no value.

That it may be of considerable importance to find the peripapillary scotoma, is shown by several cases of de Kleyn, in which the presence of the peripapillary scotoma enabled him to make the diagnosis of posterior nasal accessory-sinus disease, the diagnosis being confirmed by operation. In my Case 7, the presence of this symptom induced me to send the patient to the rhinologist, and in Case 5 the peripapillary scotoma was one of the reasons for opening the posterior accessory sinuses in spite of the fact that the X-ray examination showed nothing abnormal.

Not only for the optic nerve is it of the greatest importance to make an early diagnosis of posterior ethmoiditis or sphenoiditis, but also for the brain.

Onodi quoted Dreyfus at the International Congress at Budapest, as follows: 10 brain abscesses, 12 cases of meningitis, 1 sinus thrombosis, and 1 serous meningitis, following disease of the ethmoidal cells. Onodi added to this list 1 case of brain abscess. The statistics of sphenoidal complications show, after St. Clair Thompson and Dreyfus, 25 cases of meningitis, 5 sinus thromboses, 18 sinus thromboses with meningitis, 2 extradural abscesses with meningitis, 2 cases of meningitis serosa, 1 brain abscess, 3 cases of encephalitis, and 1 intracranial hemorrhage. To these statistics Onodi also added 1 case of brain abscess.

As the diagnosis of disease of the sphenoid and posterior ethmoidal cells is often very difficult for the rhinologist, sometimes even impossible, every symptom of this disease, which is so dangerous to the integrity of the optic nerve and even of life, is of considerable clinical importance.

With this disease, patients come more frequently to the rhinologist than the oculist, and to the latter usually only when the disease is already far advanced. It is therefore desirable for the rhinologist to be able to examine whether the optic nerve is diseased, and I believe that with some practice the rhinologist can learn to determine the size of the blind spot. Absence of the peripapillary scotoma makes the

presence of posterior nasal accessory-sinus disease very unlikely.

When the rhinologist finds the blind spot enlarged for white or colors, an oculist should be consulted as to whether there is any other abnormality present which could account for the presence of this symptom.

The above-described cases were examined with a campimeter and squares of colored paper, 1–5*mm* square, from the Heidelberg color book. The blind spot was first located, and, starting from here, the patient was told to say when he recognized the color, because, as Bull says, "it is easier to tell when a perception starts than when it stops."

CONCLUSIONS.

1. In cases of nasal disease, where there is doubt whether the posterior accessory sinuses are involved, it is necessary to examine for scotomata of the blind spot, for white and colors.
2. Enlargement of the blind spot for white and colors points with great probability to disease of the posterior nasal accessory sinuses, and justifies operative interference for this disease, if there are no other causes for the presence of the peripapillary scotoma.
3. Early treatment of the posterior accessory-sinus disease can cure the resultant optic-nerve affection.

II.

The oculist who finds a peripapillary scotoma in a patient must know which diseases can cause this abnormality besides disease of the posterior nasal accessory sinuses. That this scotoma is found in all abnormalities which enlarge the disk, or cause atrophy in its surrounding tissues, such as medullated nerve fibres, circumpapillary retinal atrophy in myopia, choked disk, etc., is self-evident, and can be disregarded here, as in these cases the ophthalmoscope immediately discloses the cause of the enlargement of the blind spot. The scotoma can also occur in hysteria, but here, the other symptoms of this disease lead us to the correct diagnosis.

Of the diseases which might cause the peripapillary scotoma,

the first to be considered are the retrobulbar optic-nerve affections, due to other causes than posterior accessory-sinus disease. In order to determine whether this is the case, I examined in the Leyden University Eye Clinic, patients with retrobulbar neuritis, whom Prof. Koster had the kindness to allow me to see.

Extracts from a few of the histories follow.

CASE 1.—B. D., 67 years of age, came for treatment on July 13, 1905, on account of reduction in vision, lasting 6 months. V.O.D. = $\frac{5}{10}$, V.O.S. = $\frac{5}{10}$. Hyperopia of 1.5 D. Central color vision poor. Only blue is recognized. Patient uses considerablet obacco.

Diagnosis.—Retrobulbar neuritis. On Feb. 24, 1906, V.O.S. = $\frac{1}{10}$; with + 1.6 = $\frac{5}{10}$. V.O.D. with + 1.6 = $\frac{5}{10}$. On March 24, 1906, V.O.S. = $\frac{5}{10}$; V.O.D. = $\frac{5}{10}$. During this time, the patient had completely stopped his tobacco and alcohol.

On Feb. 4th, V.O.S. with correction = $\frac{5}{10}$ —. V.O.D. = $\frac{5}{10}$. Lately, the patient has again been taking alcohol and tobacco in moderate quantities. The fundus shows decided pallor of the temporal half of both disks, and the veins are darker than normal. V. = $\frac{5}{10}$ each, with correction. Figs. 22 and 23 (Plate V) show that in both eyes the blind spot for white is normal or very slightly enlarged, whereas for blue and red, the scotomata are decidedly enlarged, equally in both eyes.

CASE 2.—A. V., 35 years of age, came for treatment on June 10, 1908, on account of diminishing vision in the left eye. V.O.S. = $\frac{0.5}{10}$; V.O.D. = $\frac{10}{10}$. Rest in bed and sweating were prescribed. On June 30th, V.O.S. = $\frac{5}{10}$, on July 21st, $\frac{7}{10}$, and on Aug. 18th, $\frac{10}{10}$, with correction for hyperopia.

Diagnosis.—Acute retrobulbar neuritis, left.

On Jan. 14, 1910, the patient thinks that she does not see quite as clearly as before. V. = $\frac{10}{10}$ each. The left disk is slightly pale. Fig. 24 shows that in the left eye the blind spot shows an enlarged positive scotoma for white, whereas the right eye has a normal blind spot for white, but a decided peripapillary scotoma for color (equal for red and blue). The disease therefore attacked the right eye also, but less than the left.

CASE 3.—H. von Z., 68 years of age, came under treatment in April, 1907, on account of diminished vision in the left eye. The disk was hyperæmic, the veins, swollen. V.O.S. = $\frac{1}{10}$; V.O.D. = $\frac{5}{10}$.

Diagnosis.—Retrobulbar neuritis, left.

On Jan. 14, 1910, V.O.S. = $\frac{5}{10}$; V O·D. = $\frac{5}{10}$. Fig. 26 shows that the blind spot for white is decidedly enlarged, and for colors still more, so that the temporal limits cannot be determined. There is good central color perception. The right eye has a normal blind spot for white and colors (Fig. 27). The left disk is still red, the veins are dark and broad.

CASE 4.—von A., 35 years of age. In December, 1898, V. = $\frac{5}{5}$ with —1.0 D. On Nov. 30, 1909. he came for treatment, on account of diminished vision in both eyes. The disks were red, the veins dark. V.O.S. = $\frac{4}{10}$ with correction; V.O.D. = $\frac{5}{10}$.

Diagnosis.—Retrobulbar neuritis.

On Jan. 14, 1910, V. = $\frac{4}{10}$ and $\frac{5}{10}$. The blind spots for white and colors are enlarged in both eyes, more in the right than in the left. The scotomata for white and colors are equal (Figs. 28 and 29). The disks are still hyperæmic, the veins dark.

CASE 5.—J. S., 68 years of age, came for treatment on Nov. 7, 1909, on account of poor vision. V.O.S. = $\frac{4}{10}$, after correction for astigmatism; V.O.D. = $\frac{\cdot 6}{10}$.

Diagnosis.—Retrobulbar neuritis.

On Jan. 20, 1910, V.O.D. = $\frac{5}{10}$; V.O.S. = $\frac{1}{10}$. The disks are hyperæmic.

In the right eye (Fig. 31), there was a relative central scotoma for red, an enlarged blind spot for white and for colors so large that the temporal limits could not be determined. There was an interval between the central and peripapillary scotomata.

In the left eye there was no central scotoma, but an enlarged blind spot for white. and a peripapillary scotoma for colors so large that the temporal limits could not be determined (Fig. 30).

CASE 6.—H. F. came under treatment on Dec. 23, 1908, on account of diminishing vision. V.O.S. = $\frac{3}{10}$. After correction of astigmatism, $\frac{4}{10}$. V.O.D. = $\frac{4}{10}$.

Diagnosis.—Toxic retrobulbar neuritis. Patient consumed considerable alcohol and tobacco.

On Jan. 5, 1909, V.O.D. = $\frac{4}{10}$, V.O.S. = $\frac{5}{10}$. On Jan. 27, 1910, after a period of abuse of alcohol and tobacco, V.O.D. = $\frac{5}{10}$; V.O.S. = $\frac{5}{10}$. In the left eye, the blind spot is equally enlarged for white and colors (Fig. 32), in the right eye, more for colors than for white (Fig. 33).

CASE 7.—de J., 58 years of age, came under treatment, in Aug., 1908, with gray disks and dark veins. V.O.S. = $\frac{1}{10}$; V.O.D. = $\frac{1 \cdot 5}{10}$; with +1. D = $\frac{1}{10}$ to $\frac{5}{10}$.

Diagnosis.—Retrobulbar neuritis.

On Jan. 27, 1910, there is in the left eye, an absolute

central scotoma for red, which is continuous with a peripapillary scotoma tor red. There is good central vision for white and blue, but a peripapillary scotoma, equal in size to that for red (Fig. 34). In the right eye, there is an absolute scotoma for red, which includes the fixation point and blind spot. The blind spot for white is slightly enlarged, and that for blue very much enlarged (Fig. 35).

CASE 8.—v. W., came under treatment on Nov. 24, 1908, on account of poor vision in the left eye. V.O.S. = $\frac{0.5}{10}$; V.O.D. = $\frac{7}{10}$.

Diagnosis.—Acute retrobulbar neuritis. The retinal vessels are tortuous, and the veins dilated. With rest in bed and sweating, the vision soon improved, so that on Dec. 13, V.O.S. = $\frac{8}{10}$; V.O.D. = $\frac{7}{10}$.

On Feb. 23, 1909, V. = $\frac{8}{10}$ each. On Jan, 27, 1910, V. = $\frac{18}{18}$ each. The blind spot is still slightly enlarged for white and colors, in both eyes (Figs. 36 and 37).

CASE 9.—L. D., 70 years of age, had, on Dec. 27, 1908, V.O.S. = $\frac{1}{8}$ —; V.O.D. = $\frac{6}{18}$ —. On June 23, 1909, he came under treatment, on account of diminution of the vision. At that time, V.O.D. = $\frac{1}{10}$; V.O.S. = $\frac{1}{10}$. The disks were hyperæmic, central color vision poor.

On July 4, V.O.S. = $\frac{7}{10}$; V.O.D. = $\frac{6}{10}$. On Jan. 2, 1910, V.O.S. = $\frac{7}{10}$; V.O.D. = $\frac{6}{10}$. Central color vision is now good. There is temporal pallor of the disks. In the left eye, the blind spot for white is large, for blue still larger, while for red the temporal limits cannot be determined (Fig. 38). In the right eye, the blind spot for white is almost normal, for blue enlarged, and for red the temporal limits cannot be determined (Fig. 39).

CASE 10.—A. J. S., 56 years of age. On May 31, 1898, V. = $\frac{6}{6}$ — each. In April, 1909, he came under treatment for poor vision which he had been suffering from for three months. He is a heavy smoker and drinker. V. = $\frac{0.75}{10}$ each.

Diagnosis—Toxic retrobulbar neuritis.

In June, 1910, V. = $\frac{1}{10}$ each. After this, the patient drank and smoked considerably again. On Jan. 14, 1910, V. = $\frac{3}{10}$ each. The blind spot in the left eye is normal for white. For red and blue, there is a large central scotoma, which includes the blind spot and fixation point (Fig. 40). In the right eye, there is a small absolute central scotoma for white, somewhat larger for blue, and still larger for red. The blind spot is moderately enlarged for white and blue, and very much so for red Fi(g. 41). Both disks are hyperæmic.

CASE 11.—K. A. V., 66 years of age, came under treatment on Dec. 21, 1908, on account of poor vision. V.O.S. =

$\frac{1}{15}$; V.O.D.=$\frac{1}{15}$. There are maculæ of the cornea, and lenticular opacities.

Diagnosis—Retrobulbar neuritis. On Jan. 27, 1910, V.O.S.=$\frac{1}{10}$; V.O.D.=$\frac{1}{15}$. In the left eye, there is a relative central scotoma for blue and red; the blind spot for white is normal, for blue decidedly enlarged, and for red still more (Fig. 42). In the right eye, the blind spot for white is normal, for red there is a large central scotoma, which includes the blind spot. Blue is not recognized here (Fig. 43).

A few more cases of retrobulbar neuritis were examined, in all of which the blind spot for white or colors was larger than normal.

Groenouw claims that only in exceptional cases can one observe the progress of the defect in the same patient, as the patients either abstain from tobacco and alcohol, and improve or become cured, or they do not abstain, in which case, they do not visit the doctor again. We can therefore learn about the development of the central defects only through the combination of many cases, which are seen in different stages.

If we attempt this in the above-described cases, with the scotomata drawn in Plate V., we find the first suggestion of peripapillary scotoma to be an enlargement of the blind spot for colors (Fig. 25), which may then spread in two directions, either through the development of an absolute peripapillary scotoma for white (Figs. 24, 28, 29, 32, 36, and 37), or by the scotoma for colors becoming still larger (Figs. 22, 23, 26, and 30), or through the development of a relative central scotoma for colors (Fig. 42), which may later spread (Fig. 31), and finally join the peripapillary scotoma (Figs. 34, 35, 40, and 43), so that the typical oval scotoma results.

In a few cases, there is also an absolute central scotoma for white (Fig. 41), and the last stage, which was not seen in our cases, would be an absolute scotoma for white, which includes the blind spot and fixation point.

When the scotoma for one color reaches a point on the periphery of the field for this color, the limits of the scotoma cannot be determined on this side (Figs. 26, 30, 31, 38, and 39). Occasionally the color sense may disappear entirely, as in Case 11, for blue in the right eye (Fig. 43).

Unfortunately I had no case of retrobulbar neuritis due to multiple sclerosis to examine.

In all the cases of retrobulbar neuritis, due either to toxic or other causes, examined by me, I found peripapillary scotoma, with or without central scotoma.

In the literature we find varying opinions about the relation of the blind spot to the scotomata of retrobulbar neuritis.

Most of the authors do not specify how the enlargement of the blind spot occurs, whether *per continuitatem* from the central scotoma, or as a distinct scotoma, separate from the central scotoma. It is usually described as a central scotoma which includes the blind spot, so that it might be supposed that the central scotoma is the only abnormal scotoma, and that it becomes so large as to surround the blind spot.

In general, abnormalities of the blind spot have been very little studied, which is very remarkable, since von Graefe, even in 1856, wrote: "There are furthermore to be mentioned the defects which attach to Mariotte's spot, and in cases of complete loss of function occur as enlargements of this spot. These are very common and very important"; and further down: "If on the other hand, the defect spreads considerably, the patient notices, with one eye open, that excentric objects at a certain distance to the outer side of the point of fixation are seen as though covered by a fog. This is especially the case when the defect develops from the blind spot to the centre, as occurs in the majority of cases."

This statement is opposed to the general opinion. From the various publications, we conclude that peripapillary scotomata occur often, but not always with retrobulbar neuritis, that it can be the first symptom of toxic amblyopia, and that it is almost always the first symptom of optic-nerve affections due to nasal accessory sinus disease.

Since I have shown that peripapillary scotoma may occur with or without central scotoma, we must consider these two scotomata as entirely independent occurrences, even though in advanced cases they may fuse together, and in retrobulbar neurtis iboth defects usually occur.

Of great interest to me in connection with the foregoing, were the following communications:

1. From A. Maitland Ramsay and Sutherland, who found in 5 cases of sympathetic irritation, enlargement of the blind spot.

2. From Holth, who, in 3 cases of sympathetic iridocyclitis following trauma, found a central scotoma.

Maitland Ramsay and Sutherland found the enlargement, which was in some cases considerable, always above and below, so that the blind spot always took on a spindle shape, which was also described in an additional case by Rowan and Sutherland.

The authors believe that this enlargement is due to swelling of the large vessels. "It seems therefore highly probable if not almost certain, that the spindle-like enlargement of the blind spot denotes active congestion of the optic disk, the shape being determined by increase in size and turgescence of the superior and inferior branches of the retinal artery and vein." This does not seem probable to me, as I have in many cases of hyperæmia of the disk and vessels, and even in papillitis, been unable to discover an enlargement of the blind spot. Furthermore the authors state, that in their fourth case, 48 hours after the operation, "the condition of the fundus was unchanged, and the blind spot had resumed its normal size and shape." If the "congestion of the optic disk and the increased size and turgescence of the retinal artery and vein" were the cause of the enlargement of the blind spot, the latter should not have entirely disappeared with the "unchanged condition of the fundus." Furthermore the authors state that in one case of injury in the ciliary region of one eye, according to a competent examiner, pathologic redness of the disk appeared in the second eye, yet no enlargement of the blind spot was present. The eye was not enucleated, and became quiet. The authors therefore give the proof themselves, that congestion of the disk of the second eye and enlargement of the blind spot do not always go together in sympathetic irritation.

If the enlargement of the blind spot were due to congestion of the disk and dilatation of the vessels, the examination for the scotoma would be unnecessary, as the ophthalmoscopic examination would show the abnormality much easier and quicker. Furthermore, an enlargement of the spot due

to dilatation of the vessels above and below would not be true spindle-shaped, but would take the form of a spindle, with, at the upper and lower ends, a distinct division of the large vessels, which, in such a swelling, must give rise to decided scotomata.

Holth found in 3 cases of sympathetic iridocyclitis after trauma, a central scotoma in the sympathizing as well as in the injured eye, which scotoma, after cure of the inflammation, again disappeared. In those cases in which the fundus could be seen, there was no trace of papillitis. In other cases of sympathetic inflammation, Holth found no central scotoma.

The similarity of both these observations of sympathetic affections of the eye with the changes found in retrobulbar optic neuritis is very evident. In both, there are enlargements of the blind spot and central scotomata.

It seems probable to me that in sympathetic disease of an eye the optic nerve becomes affected behind the globe, as a result of which the blind spot becomes enlarged first, and then a central scotoma appears, just as in toxic amblyopia and optic-nerve affections due to accessory sinus disease.

Maitland Ramsay and Sutherland could find no central scotoma, because they observed the cases at the beginning of the disease, when there was only irritation. Holth, on the contrary, observed advanced cases, where iridocyclitis was already present, and could find central scotoma. It is my opinion that in all probability there was enlargement of the blind spot in Holth's cases also, but Holth did not examine for this, as he was kind enough to write me.

Of great interest is what Holth emphasizes in his publication, and in his letter to me, that where it was possible to see the fundus it could be positively determined that the disk was not inflamed. As there was no intraocular optic-nerve involvement, a retrobulbar affection of the optic nerve was the most probable cause of the scotomata, as there was in these cases no reason for assuming the existence of a central retinitis or choroiditis.

Holth's opinion, that the cause of the central scotoma was a "toxic affection of the optic nerve due to resorption of the intraocular inflammatory products," might explain his cases, but in the cases of Maitland Ramsay and Sutherland,

we see an abnormality of the optic nerve without cyclitis, and furthermore I was never able to find scotomata in cyclitis due to other causes. Therefore it seems simpler to me to look for an explanation which can explain both conditions, as well as the occurrences in retrobulbar optic-nerve affections due to other causes.

That Holth could find no central scotoma in other cases need not surprise us, as it is possible that in these cases the optic nerve was not yet diseased, or only the peripapillary scotoma was present, as is often the case for so long a time in accessory sinus disease before a central scotoma appears.

The anatomical basis of an enlargement of the blind spot must be an involvement of those nerve fibres which take their origin in the retina about the disk. By analogy to the name papillo-macular bundle which is given to the fibres which arise in the area between the macula lutea and disk, we can give to these fibres the name peripapillary bundle, without saying as Uhthoff says of the papillo-macular bundle: "To look upon diseases of this bundle as a tract involvement in the real sense, as the spread of the anatomical process may have a very variable extent, and is not confined to the limits of a certain nerve-fibre bundle, the partial optic-nerve involvement is not to be compared to a tract degeneration of the spinal cord."

It is known of the peripapillary fibres, that in the neighborhood of the disk, they are situated in the most peripheral part of the optic nerve (Leber, Michel, Bunge).

Fuchs says: "The most peripheral bundles, lying immediately under the pial sheath, supply that portion of the retina bordering on the disk. This is the case at least in the anterior vascular portion of the nerve. A loss of the peripheral bundle would therefore cause an enlargement of the blind spot." In his *Lehrbuch der Augenheilkunde*, 8th edition, pp. 536, 537, he says: "The fibres coming from the peripheral portions of the retina lie in the centre of the nerve, and those from the central portions of the retina lie on the margins of the nerve."

The peripapillary bundle is, as we have seen above, clinically distinct from the papillo-macular bundle, and anatomically

in the anterior portion of the optic nerve, the one bundle includes a temporal sector, and the other a peripheral ring. The bundles are therefore physiologically as well as anatomically distinct.

The cases of Groenouw, Maitland Ramsay, Sutherland, de Kleyn, and myself, in which the blind spot is enlarged, prove that the peripapillary bundle may become diseased alone, so that, although this bundle is much less important than the papillo-macular bundle functionally, we still have the right to speak of a peripapillary bundle.

In anatomical examinations of optic nerves after diseases which caused peripapillary scotomata alone, or with central scotoma, which includes the blind spot, it will have to be noticed what the condition of the peripheral fibres is, because we can, by following these in successive sections, learn the course of the peripapillary bundle, just as we have in the case of the papillo-macular bundle. Perhaps old preparations can also be examined for this.

It is not surprising that atrophy of this bundle has attracted little notice, because the examination was always undertaken in eyes in which the papillo-macular bundle was also diseased, in which case this bundle, comprising ¼ to ⅓ of all the nerve fibres, immediately drew attention to itself, whereas the peripapillary bundle, which plays a very unimportant rôle functionally, consists of only a small number of fibres, which form a very narrow ring on the periphery of the optic nerve.

Furthermore it seems to be very difficult to prove an atrophy of a small portion of the optic-nerve periphery, since such experienced observers as Fuchs and others called a condition peripheric atrophy, which later Kiribuchi and Greeff proved to be a peripheral glia sheath.

Vossius writes in the pathologic examination of a case of retrobulbar neuritis: "In addition to this central patch, I found a band at the lower periphery to be atrophic. Whether this belonged to the papillo-macular bundle, or the periphery of the retina, I cannot decide, as I had not access to the visual fields of the case."

The cause of disease of the peripheral bundle of the optic nerve is not known. Fuchs thinks that it may be caused

by compression of the vessels, or by mechanical or chemical injurious effects of the lymph.

Birch-Hirschfeld and Kuhnt look for the cause of retrobulbar neuritis, with disease of the posterior nasal accessory sinuses, in toxin action. Birch-Hirschfeld explains the localization in the papillo-macular bundle by a venous congestion in a localized vascular area.

Schieck also considers the cause to be a toxic œdema, but not local in the papillo-macular bundle, but in the entire optic nerve, while the location of the disease is determined by the lesser resisting power of the papillo-macular fibres.

De Kleyn was able to prove that tamponade of the orifices of the accessory sinuses causes an enlargement of the blind spot only in cases with disease of the mucous membrane of these cavities, and not in cases with normal mucous membrane, so that in addition to congestion, intoxication also plays a rôle in disease of the peripapillary bundle.

In order to be able to conceive the causation of disease of the peripapillary bundle, we must know in what part of the nerve this bundle lies, in the region of the optic canal.

According to Jatzow and Uhthoff, the position of the nerve fibres in the proximal portion of the optic nerve coincides with their projection in the visual field. Therefore the peripapillary fibres are centrally located, and the fibres of the retinal periphery are situated peripherally. Birch-Hirschfeld also says that involvement of the peripheral nerve fibres causes peripheral contraction of the field.

According to Bunge, Fuchs, and others, in the distal portion of the nerve, the fibres for the retinal periphery are centrally located, and those for the central portion of the retina peripherally, with the exception of the papillo-macular bundle. If both these statements are true, the fibres which are centrally located near the globe lie peripherally near the optic canal, and vice versa. Therefore there must be a very extensive decussation of the fibres, which, as far as I know, has never been observed.

It seems likely to me, that, with the exception of the papillo-macular bundle, whose course is well known, the fibres which lie peripherally, remain peripheral. According to Bunge and

Fuchs, these are the peripapillary fibres, whereas Jatzow and Uhthoff say that they are centrally situated.

The course of the fibres in the optic nerve is not well known yet, and only pathologic-anatomical examinations can help us to learn their course. The course of the peripapillary bundle could be best learned in a patient in whom only the blind spot is enlarged. But it is, a priori, very unlikely that such a case will come under examination, so that we must, as above stated, examine whether in the cases of central scotoma which extend beyond the blind spot the peripheral fibres are diseased. If this is not the case near the globe, then the schema of Bunge and Fuchs is incorrect.

If the peripapillary fibres lie peripherally, and retain their peripheral location, it is easy to see why these fibres become affected first. The peripheral fibres are directly bathed by the lymph, and lie nearest the inflammatory area, when the inflammation of the mucosa of the nasal accessory sinuses extends to the periosteum and nerve sheaths. If there are toxic materials in the lymph, these can attack the peripapillary fibres immediately, whereas, in congestion, with the resultant œdema and swelling, the peripheral fibres may be compressed by the edge of the bony optic canal.

Birch-Hirschfeld writes: "The inflammation can naturally extend farther to the interstitial connective tissue of the optic nerve. We then have to deal with an interstitial neuritis, such as Uhthoff regards as the basis of chronic tobacco and alcohol amblyopia. The infiltration extending from the nerve sheaths in the optic canal to the septa, would, if the inflammation started from a medially situated accessory sinus, lead us to expect a lesion of the nasal peripheral fibres. This would be indicated by a peripheral contraction of the field, but such was not the case, in the cases mentioned."

If, however, the peripapillary fibres remain peripheral, a lesion of the peripheral fibres would not cause a peripheral limitation of the field, but an enlargement of the blind spot, which, as we have seen, occurs in accessory sinus disease, as well as in toxic amblyopia. If the toxic œdema extends farther, over the entire cross-section of the nerve, the papillomacular bundle can become affected before the remaining fibres, on account of its lesser resisting power.

According as to whether the process extends more or less rapidly over the entire cross-section of the nerve, the central scotoma will appear in a shorter or longer period of time after the peripapillary scotoma.

In toxic amblyopia, the greatest severity of the disease is not always situated in the same part of the nerve. This would probably also influence the choice of the bundle which is first affected.

Uhthoff says that in many cases of toxic amblyopia, the optic nerve is most affected near the optic canal; in other cases, the disease process is limited to the anterior orbital portion of the nerve, which facts make it probable to Uhthoff that the optic nerve may be attacked in various portions of its course.

In accessory sinus disease, when the optic nerve becomes affected, the point of attack is always near the optic canal. For this reason, the peripapillary bundle will always be involved first. By analogy, we may reason that in toxic amblyopia and other retrobulbar optic-nerve affections, the peripapillary bundle becomes first affected if the disease begins in the optic canal, whereas, if it begins farther forward, where the peripheral bundles lie more free, these become affected at the same time or even later than the papillomacular bundle.

It is probable that also in other optic-nerve diseases in the optic canal (hemorrhages, callous formation after fracture of the base, etc.), a peripapillary scotoma may occur. De Kleyn, who is investigating this, informed me that in two cases of cured fracture of the base of the skull there was an enlargement of the blind spot.

Crzellitzer noted in one case of tumor of the hypophysis cerebri, enlargement of the blind spot in the right eye, while in the left eye there was a central scotoma including the blind spot. Here, therefore, there was involvement of the peripapillary bundle on both sides, in disease near the optic canal.

The diagnosis does not seem to me to be positive in this case. This was made principally through the X-ray picture, even though the principal symptoms of hypophysis tumors were not present. It is well known, however, that disease

of the sphenoidal sinus can cause appearances in the X-ray plate which may closely simulate hypophysis tumor. Because, as stated above, enlargement of the blind spot and central scotoma occur in disease of the sphenoidal sinus, it would have been desirable to examine the accessory sinuses in this case.

The occurrence of scotomata in sympathetic irritation and inflammation can be accounted for in the same way as in toxic amblyopia.

According to the much disputed theory, recently revived again by Roemer, the transmission of the sympathetic inflammation occurs along the blood-vessels, and therefore, as in toxic amblyopia, blood and lymph can carry the noxious agents, which, coming through the peripheral blood and lymph channels, may attack the peripheral nerve fibres, and coming through the central vessels, may attack the central bundle of nerve fibres.

According to the Mackenzie-Deutschmann theory, also, the occurrence of a retrobulbar neuritis can be explained, because here the noxious agent travels from one eye to the other along the optic nerve and its sheaths, thus immediately attacking the peripheral fibres, and later, with extension of the process, involving the non-resistant central papillomacular bundle.

A retrobulbar optic neuritis is not so easy to explain by the ciliary-nerve theory, although according to the modified theory an endogenous cause of the inflammation is assumed. The site of the appearance of the inflammation is determined by the sympathetic ciliary irritation, and therefore there would be no reason why the first change should be the appearance of a retrobulbar optic neuritis.

Schirmer says that the involvement of both optic nerves and the chiasm in sympathetic inflammation was found regularly in the cases examined up to the present (Deutschmann's and Grunert's). Wagenmann also states that in a case of sympathetic ophthalmia examined by him, the nerve sheaths of the exciting eye showed considerable nuclear increase and infiltration, which extended to the peripheral layer of the nerve. A striking appearance in the exciting eye was a regular infiltration of the nerve sheaths, especially

in the portion lying nearest to the nerve. Here there were tracts of lymphocytes in the most superficial layers of the nerve. These changes were present in the entire portion of the nerve which was accessible.

We see, therefore, in certain cases, perineuritis and disease of the superficial layers of the optic nerve. This could explain the appearance of the scotomata.

In agreement with the presence of the same changes in both nerves, is the fact that Holth found central scotomata in both eyes. The appearance of a retrobulbar neuritis fits in well with Schirmer's hypothesis, that sympathetic papillo-retinitis depends upon the spread of toxic materials from one eye to the other, probably by way of the optic nerves. We know that in toxic amblyopia and in accessory sinus disease, retrobulbar neuritis may occur through toxic substances, so that it is probable that this can occur in the same way in sympathetic ophthalmia. According to Maitland Ramsay, the scotoma disappears after enucleation of the exciting eye. Holth also states that the central scotoma may disappear after cure of the inflammation, as is mostly the case in diseases due to toxic materials, when the supply is cut off.

As the scotomata, according to Maitland Ramsay and Sutherland, occur already in sympathetic irritation, this symptom can be of considerable importance as a warning that there is already a retrobulbar process going on in the optic nerve, and that it is high time to interfere.

Why the blind spot was found enlarged only above and below, in sympathetic ophthalmia, is difficult to explain. In posterior accessory-sinus disease, there occur also blind spots which are enlarged principally vertically (Figs. 6, 9, and 18), but this form is not typical.

With central location of the peripapillary fibres, an explanation of their isolated involvement would be very difficult.

If, as Schieck thinks, the disease-producing toxic œdema extends over the entire cross-section of the nerve, and causes an involvement of the less resisting fibres, an isolated involvement of the centrally located peripapillary fibres would not be explained, as there are not the same causes for extreme vulnerability in the case of these fibres as in the case of the papillo-macular bundle, namely, the marked functional

demands which are made upon them, their thin myelin sheaths, and the delicacy of the fibres.

If both bundles are centrally located, in disease of the cross-section of the nerve, the papillo-macular fibres would always be involved first, unless the noxious agents have a specific effect upon the various bundles, as Forti Nemo has tried to prove for nicotin. In his studies of the optic nerves of dogs, when these were placed in 1% solutions of nicotin, there were characteristic changes in the temporal quadrant in the shape of compressed and disordered nerve bundles. Such specific effects of the various toxins would easily explain the involvement of individual bundles, during the spread of the toxic œdema over the entire cross-section of the nerve.

However, this does not appear very probable to me. The changes in one part of the nerve need not be due to specific action of the poison upon this part, but may, as also in Forti Nemo's nerves, be due to lesser resisting power of this portion against all injurious substances; as is assumed for the papillo-macular bundle.

Birch-Hirschfeld looks for the cause of the central scotoma in an isolated involvement of the papillo-macular bundle as a result of venous congestion in localized vascular areas, whereas Sachs, who thinks that a temporal paracentral scotoma is always the first defect to appear, also thinks the cause of the involvement of the paracentral fibres to be a congestion in a localized vascular area. This area would be the area of a branch of the vena centralis posterior, around which the paracentral portion of the papillo-macular bundle is grouped. The remaining portions of the papillo-macular bundle become involved later, and not so profoundly, because they are not affected directly, but through collateral disturbances (hyperæmia and œdema), or because the more peripheral bundles of the papillo-macular bundle have access to a richer collateral circulation.

There is a possibility that the peripapillary bundle, like the paracentral fibres, is drained by a branch of the vena centralis posterior, and that with disease of this branch a peripapillary scotoma arises.

This does not seem probable to me, however, because we would then have to assume for the central the paracentral

portion of the papillo-macular bundle, and for the peripapillary bundle, different localized vascular areas. It seems to me much more likely, that the peripapillary fibres retain their peripheral location, and therefore become first involved in disease of the optic nerve, whereas, after these fibres, the noxious agent attacks the least resisting portion of the nerve, the papillo-macular bundle, and finally the fibres which lie between these and supply the periphery of the retina.

Pathologico-anatomical examinations will eventually teach us the arrangement of the fibres.

As to the bilateral appearance of the peripapillary scotoma in unilateral nasal accessory-sinus disease, outside of the anatomical variations described by Onodi, there is the possibility mentioned by Vossius, that, where the distance between the nerves near the intracranial opening of the optic canal is scarcely 1*cm*, and this narrow space filled in by very loose tissue arising from the meninges, which is very well adapted to the spread of the inflammation, the inflammation can spread immediately from one nerve to the other, at this place.

Sachs does not accept this explanation for toxic amblyopia, because here the disease occurs almost always simultaneously in both eyes, and on account of the normal condition of the nerve sheaths and the entire peripheral bundle. As, however, in nasal accessory-sinus disease, the nerve sheaths and peripheral nerve fibres are very likely involved, Vossius's hypothesis is very acceptable for these cases.

The changes in the nerve in accessory sinus disease can, as de Kleyn showed, be due to congestion as the result of the action of toxic materials. If this has lasted only a short time, the removal of the etiological factor can cause the toxic œdema to disappear, and the visual field can return to the normal, as in most of our cases. If the disease has lasted longer, however, this can no longer take place, and atrophy of the affected bundles occurs, which causes a permanent defect in the visual field, and impairment of vision, as in the case previously described by me.

Although the peripapillary bundle is not very important functionally, it is of a good deal of interest clinically, because disease of this bundle can show the presence of a retrobulbar

neuritis, in a stage when this dangerous disease may, in many cases, still be cured.

CONCLUSIONS.

1. There is a peripapillary nerve-fibre bundle, which may be the first portion of the nerve to be involved in retrobulbar neuritis. This is shown by enlargement of the blind spot for white or colors.

2. Enlargement of the blind spot occurs in almost every case of disease of the posterior nasal accessory sinuses.

3. In retrobulbar neuritis, the papillo-macular and peripapillary fibres are usually affected alone, or long before the remaining fibres of the nerve.

4. In sympathetic ophthalmia, the papillo-macular and peripapillary fibres may become involved. It is of the greatest importance to study this further, because this symptom, if it were often found, would be of great value for the prognosis and therapy of sympathetic ophthalmia.

REFERENCES.

1. J. Van der Hoeve. "Optic nerve disease in disease of the posterior nasal accessory sinuses." *Arch. f. Augenheilk.*, lxiv., part 1, 1909.

2. Uhthoff. "Transactions of the Ophthalm. Section of the British Medical Assoc., held at Oxford, 1904." *Arch. f. Augenheilk.*, li., p. 349.

3. Schieck. "The etiology of retrobulbar neuritis." *Arch. f. Ophthalm.*, lxxi., part 3.

4. Jung. "A contribution to the relationship between optic neuritis and nasal disease." *Graefe's Arch. f. Ophthalm.*, lxxiv., p. 362.

5. de Kleyn. "A contribution to the study of optic-nerve diseases in disease of the posterior nasal accessory sinuses." *Arch. f. Ophthalm.*, lxxv., part 3.

6. Onodi. "Intracranial and cerebral complications of nasal accessory-sinus disease." *Arch. f. Augenheilk.*, lxv., part 2, p. 262. Transactions of the 16th International Medical Congress.

7. Ole Bull. *Perimetry*, 1895, p. 4.

8. Groenouw. "Toxic amblyopia." *Arch. f. Ophthalm.*, xxxviii., part 1, p. 32.

9. Bunge. *The Visual Field and Fibre Tracts in the Optic Nerve Apparatus.* Halle, 1884, p. 8, Schema 1.

10. O. Baer. "Examination of the visual fields, and their general diagnostic value." *Collection of Clinical Lectures*, Volkmann, No. 246, 1884.

11. Leber. "On the occurrence of anomalies of the color sense, in

diseases of the eye, with observations on certain forms of amblyopia." *Arch. f. Ophthalm.*, xv., part 3, pp. 99, 100.

12. Baas. *The Visual Field.* Stuttgart, 1896, p. 163.

13. Uhthoff. Graefe-Saemisch, *Handbuch der gesamt. Augenheilk.*, xi., part 2, chap. 22.

14. von Graefe. "Examination of the visual field in amblyopic affections." *Arch. f. Ophthalm.*, ii., p. 274.

15. Maitland Ramsay and Sutherland. "Spindle-shaped enlargement of the blind spot, associated with congestion of the optic disk." *The Ophthalmic Review*, 1906, 1.

16. Holth and Soederlingh. "Du diagnostic du scotome central pour les couleurs à l'aide de trois objets identiques simultanes." *Annales d'oculistique*, Sept., 1908, 140.

17. Rowan and Sutherland. *The Ophthalmoscope*, Jan., 1910, p. 8.

18. Fuchs. "Peripheral atrophy of the optic nerve." *Graefe's Arch. f. Ophthalm.*, xxxi.

19. Samelsohn. "Anatomy and nosology of retrobulbar neuritis." *Arch. f. Ophthalm.*, xxviii., part 1, p. 8.

20. Th. Sachs. "Anatomico-clinical contribution to the study of central scotoma in optic-nerve affections." *Arch. f. Augenheilk.*, xviii., p. 26.

21. Kiribuchi. "On Fuchs's peripheral optic atrophy." *Arch. f. Augenheilk.*, xxxix., p. 76.

22. Vossius. *Text-Book of Ophthalmology*, 3d edition, p. 681.

23. Birch-Hirschfeld. "Contribution to the study of optic-nerve disease in disease of the posterior nasal accessory sinuses." *Arch. f. Ophthalm.*, lxv., 1907.

24. Kuhnt. "The relationship between nasal disease and ocular disease." *Deutsche medizinische Wochenschrift*, Sept., 1908, No. 37 and 38.

25. Jatzow. "Contribution to the study of the retrobulbar propagation of choroidal sarcoma, and the course of the nerve fibres in the optic nerve." *Arch. f. Ophthalm.*, xxxi., part 2, p. 233.

26. Uhthoff. "On the effect of chronic alcoholism on the human eye." *Arch. f. Ophthalm.*, xxxii., part 4, p. 157.

27. Crzellitzer. "Tumor of the hypophysis with unusual visual disturbances." *Berliner klin. Wochenschr.*, 1909, No. 20.

28. Schirmer. "Sympathetic ophthalmia." *Handbuch der gesammten Augenheilk.*, vi., part 2, p. 119.

29. Wagenmann. "On the microscopic findings in a case of sympathetic ophthalmia, in which both globes came to examination at an early stage." *Graefe's Arch. f. Ophthalm.*, lxxiv., p. 489.

30. Forti Nemo. "On the alterations of the optic nerve in contact with solutions of nicotin." *Arch. di Ophthalmologia*, i., part 2, 1910, p. 280.

31. Th. Sachs. "Studies in the pathology of the optic nerve." *Arch. f. Augenheilk.*, xxvii., p. 204.

32. Vossius. "Contributions to the anatomy of the optic nerve." *Graefe's Arch. f. Ophthalm.*, xxix., part 4, p. 145.

REPORT OF THE THIRTY-SIXTH MEETING OF THE OPHTHALMOLOGICAL SOCIETY AT HEIDELBERG, AUGUST 4–6, 1910.

By Dr. W. CLAUSEN, Berlin.

Translated by Dr. Matthias Lanckton Foster.

THURSDAY, AUGUST 4, 9 A.M. FIRST SCIENTIFIC SESSION, SWANZY PRESIDING.

1. Birch-Hirschfeld (Leipsic): **The changes in the optic nerve in diseases of the orbit.**

Birch-Hirschfeld described the anatomical conditions present in 5 cases in which he had studied the orbit and the optic nerve from the globe to the optic canal.

The first case was one of commencing interstitial neuritis from direct involvement of the posterior part of the nerve trunk in the inflammation without signs of degeneration.

In the second case (thrombophlebitis orbitæ after direct injury) there was a sharp bend of the optic nerve at its commencement with laceration of the nerve fibres and constriction of the central vessels.

In the third case a tuberculosis that had extended from the dural sheath to the orbit and optic nerve had produced complete degeneration of the upper third of the section in the part containing the vessels, which was permeated by dense connective tissue.

The fourth case was one of alveolar carcinoma of the ethmoid which had extended into the orbit, had produced choked disk by compression of the veins and a circumscribed central focus of degeneration in the optic nerve behind the opening of the vessels through stasis œdema of the venous branch opening here from behind into the central vein.

The fifth case, one of orbital metastasis from a carcinoma of the breast, was distinguished by the great change in the section of the nerve induced by the pressure of the tumor upon three sides of the nerve. In the centre of the triangular section was a degeneration of the nerve fibres which extended backward to a zone running obliquely through the nerve.

The polymorphean picture of optic-nerve changes in affections of the orbit, in which sometimes circulatory disturbances, sometimes a direct involvement of the nerve trunk in the process, sometimes mechanical effects, were to be recognized, corresponds to the very heterogeneous clinical picture. It may thus be wrong to wish to assume a uniform genesis of the lesion of the optic nerve in diseases of the orbit.

2. R. SCHNEIDER (Munich): **The nature of the action of the pneumococcus immune serum.**

Schneider first studied the nature of the natural immunity, or resistance, to the pneumococcus. He chose the guinea-pig as the subject of experiment chiefly because it is very little sensitive to the pneumococcus infection and must therefore be provided with abundant preventive. The pneumococci used were very virulent for mice and quite pathogenic for rabbits; the lethal quantity of culture for guinea-pigs was about 0.75 *ccm*, *i. e.*, about 320 millions of pneumococci. The destruction of this great number of germs, which took place intraperitoneally without phagocytosis, is not accomplished by the active constituents of the serum, but by "leucine." The latter is a heat-enduring, bactericide material which may be given off by living leucocytes in response to certain stimuli and forms a natural means of protection together with the bactericide materials of the serum and phagocytosis. Schneider set free in vitro and intraperitoneally, by the addition of pneumococcus extract and washed out pneumococci, the substances contained in the leucocytes of guinea-pigs which are fatal to pneumococci. As the natural immunity of the guinea-pig depends on the extracellular bacteriolysis of the pneumococci by the leucine, he instituted experiments concerning the relations between immune serum and the formation of leucine, which resulted in the knowledge that a protective action of the pneumococcus immune serum in the sense of an increased

production of leucine is excluded. Further experiments confirmed the theory of Neufeld that the action of the pneumococcus immune serum is to be ascribed to its specific tropines, *i.e.*, to heat-enduring materials of the serum which favor phagocytosis. Phagocytosis experiments in test-tubes with leucocytes from guinea-pigs, rabbits, mice, and man showed a specific ability to destroy pneumococci only when immune serums were added. Encapsuled pneumococci were also taken up by the leucocytes under the influence of the pneumococcus antibodies. The results obtained in vitro correspond to the result of the experiments made in the abdomens of guinea-pigs and rabbits. The relations between the protecting power of the different pneumococcus serums and their bacteriotropic action were proven by the parallelism of the two functions. Two serums tested as to their biological properties were ineffective in this respect and particularly lacked any capacity to make pneumococci amenable to phagocytes, consequently had no protective power in the infection experiment. Many experiments were undertaken to determine in how weak a dilution the immune serums still induced specific phagocytosis. Guinea-pig leucocytes still showed phagocytic capacity when the addition of immune serum amounted on the average to about 1%, with rabbit leucocytes the phagocytosis ceased with a dilution of the serum to from 1:400 to 1:800, while in man an increase of the phagocytosis was to be noticed with a dilution of the immune serum of from 1:800 to 1:1000. These figures indicate the restricted specific action of the pneumococcus serums in comparison with other immune serums. But Schneider believes that the limit of dilution found in the test-tube holds good in the organism. If a pneumococcus serum should be used in a greater dilution, the chances of the sero-therapeutic attempt with pneumococcus serum in the body would be impaired by the great distribution of the antibodies and it would be difficult to obtain an accumulation of the specific substances in the desired concentration in the blood and juices of the body.

3. MIYASCHITA (Freiburg): **The participation of the cornea in pneumococcus immunity.**

Miyaschita has made intralamellar inoculations of the

cornea in a large number of rabbits in two ways: one with heart blood, the other with various dilutions of a culture of pneumococci in bouillon. He has thus shown that the participation of the cornea in pneumococcus immunity is insignificant. The production of an inoculation keratitis was not generally prevented by a prophylactic injection of serum of the homologous stock—it was delayed and ran a milder course than in the control animals; while with heterologous stocks no influence through the serum could be demonstrated. Only with active immunization by repeated injections of pneumococci, which could hardly be carried out in man, could the keratitis be prevented with certainty. Hence it results that the indications for pneumococcus therapy is a very limited one, chiefly confined to prophylaxis.

4. GEBB (Greifswald): **The participation of the cornea in active and passive immunization.**

The question is frequently met with whether the cornea, in consequence of its anatomical construction, participates in immunization. It has been answered experimentally by Roemer as regards the diphtheria toxin with a positive result. A large series of experiments with the bacillus suisepticus gave unobjectionable evidence that it is possible therapeutically to influence an infection of the cornea of a rabbit by active and passive immunization with homologous and heterologous serum, and thus that specific antibodies penetrate into the infected cornea. The best results were produced by active immunization; good results were likewise obtained by passive immunization with homologous serum. In order to produce a good effect upon the corneal infection through passive immunization with heterologous serum large doses of the specific serum must be injected into the veins.

5. W. GRUETER (Greifswald): **The participation of the rabbit's cornea in the general vaccine immunity.**

Grueter immunized rabbits by repeated subcutaneous and intravenous injection of vaccine, as well as by superficial cutaneous inoculation, and tested the behavior of the cornea against an infection with diluted lymph. In all of the numerous experiments the influence of the general immunity upon the cornea was made manifest by the fact that in a part of them no inflammation was set up in the infected eye and

in the remainder the keratitis was much milder than in the control animals.

6. A. v. Szily, Jun. (Freiburg): **The embryological basis for the explanation of congenital cataract.**

The demonstration is brought for the first time from successive stages of development that certain congenital forms of cataract in rabbits start from an atypical lens germ. Dismembered, scattered groups of cells are found first in the stage when the lens is becoming separated. In the course of development this atypical cell complex grows into lens fibres, but breaks down and involves in the process more or less of its neighborhood, thus giving rise to typical malformations of the lens, such as fusiform cataract, certain forms of anterior and posterior polar cataract, and the congenital punctate cataract.

7. Axenfeld (Freiburg): **Retrogression of the glaucomatous excavation.**

Since his article in 1902 concerning retrogression of the glaucomatous excavation after operations that reduced the tension the writer has observed this phenomenon not less than fifteen times. It thus seems to be of frequent occurrence and not a rarity, though often overlooked. In order to demonstrate it it is necessary to examine with the ophthalmoscope soon after the operation and to have made previously an accurate sketch of the excavation in order that slight degrees of retrogression may not be overlooked. Complete retrogression is rare, partial common. The nasal half in particular often returns partially or wholly to the level of the retina; in many cases portions of vessels are again visible which previously disappeared at the edge of the excavation, and the refraction of the floor of the excavation may retrogress several dioptries. In many cases the returning tissue of the papilla appears somewhat cloudy and œdematous with capillary hemorrhages visible in the upright image. In the majority of cases the retrogression is transitory and limited to the time of the great hypotony after the operation; particularly is it present during post-operative detachment of the choroid, with the disappearance of which the original picture is re-established. But in many cases in which the operation is of good effect the papilla remains permanently replaced at a different level.

The occurrence of this retrogression is not confined to superficial excavations in the early stage of the disease; there is a great difference in this respect between cases which reflect the individually varying elasticity of the lamina cribrosa and the ability of the papilla to recover. Many very deep excavations retrogress to a marked degree, many superficial ones do not change.

These observations afford new evidence that the excavation is caused by the increased tension. They also show that we must cease to consider the position of the lamina cribrosa in glaucoma excavations as a constant one; for a varying length of time it may undergo a greater or less degree of elastic displacement.

The return forward of the papilla in general affects vision favorably, though the best vision is not always present in the stage of the first, greatest displacement. On the other hand, these fluctuations of level may give an explanation of the well-known but hitherto unexplainable deteriorations of vision and of the visual field after operations that render the tension normal, especially in cases of glaucoma simplex. The fluctuation of tension acts more deeply than we have supposed, so that within the optic nerve injured fibres may be completely torn perhaps by the movement of the lamina, or they may suffer from œdema or small retrolaminar hemorrhages.

Discussion: VOSSIUS, GILBERT, FLEISCHER, and BRUECKNER reported that they had observed this phenomenon. Vossius asked whether it was not chiefly met with in young people. Brueckner ascribed it to an œdema of the papilla following operation. VON HIPPEL inquired how long after the operation the retrogressive metamorphosis of the excavation had persisted. AXENFELD replied that some of his patients were young, and that in some cases the retrogressive metamorphosis had lasted three or four years.

8. v. PFLUGK (Dresden): **The accommodation of cephalopods and fishes.**

Comparative measurements of the length of Langer's muscle, hitherto known as the muscle of accommodation, in the frozen eyes of the octopus and eledona showed that this muscle is longest in the freshly enucleated eye, shorter

in the atropinized eye, and shortest in the eye that had been faradized, while the corpus epitheliale lentis was longest in the atropinized eye, shorter in the freshly enucleated natural eye, and shortest in the faradized eye. From this marked, and hitherto unknown, contractility of the corpus epitheliale v. Pflugk concludes that it is directly related to accommodation, possibly represents the apparatus of accommodation itself, and that Langer's muscle perhaps serves only as a regulator of intra- and extra-bulbar fluctuations of tension. In the eyes of fishes he confirmed the observations of Beer regarding the movement of the lens for distance and near.

9. IGERSHEIMER (Halle): **To what degree is the modern diagnosis of syphilis and tuberculosis in position to modify the theories hitherto held concerning the etiology of certain diseases of the eye?**

The most important points made were as follows:

1. Wassermann's reaction is to be considered as a symptom of a still existing, florid, syphilitic process, consequently a negative result speaks against the syphilitic character of a fresh inflammatory affection of the eye.

2. In syphilitic processes in the eye which have run their course an incomplete inhibition of the hæmolysis is not rarely met with; this should be counted as a positive result considering the clinical picture.

3. The demonstration of spirochætæ may be of importance in external affections of the eye, as in a case of tarsitis luetica reported by the writer.

4. From the serological and clinical conditions in 104 cases of primary parenchymatous keratitis the writer has come to the opinion that syphilis is almost the only etiological factor in this disease. Tuberculosis seems to play almost no direct etiological part.

5. Parenchymatous keratitis is a true luetic disease, *i. e.*, it is caused by spirochætæ.

6. In diseases of the uvea syphilis is to be regarded as the most important exciting factor only in childhood; according to his own observations chorio-retinitic processes were due to syphilis in over 60% of the children but not in 15% of adults.

7. In adults tuberculosis has an overwhelming importance

in uveal affections; in 34 of his own accurately worked out cases in tuberculous individuals the eye diseases in 52.9% must be considered as autotuberculous, and all iritises with visible nodules, together with almost all cases in which the choroid as well as the anterior segment of the globe was involved, proved to be tuberculous, while the cases of serous iritis as well as the isolated opacities of the vitreous fell for the most part into the category of questionable, or not tuberculous.

8. The diseases of the sclera, even the "rheumatic," are frequently tuberculous; the joint affections to which they are often etiologically referred may themselves be tuberculous.

9. Tuberculosis may produce the picture of retrobulbar neuritis with central scotoma, as shown for the first time with certainty by 3 clinically observed cases.

10. The retina also is here and there the seat of tuberculosis.

10. GULLSTRAND (Upsala): **New methods of ophthalmoscopy without reflex.**

Gullstrand demonstrated with his ophthalmoscope a method of centric ophthalmoscopy without reflex by means of which greater enlargements can be obtained than have been possible hitherto; a method of stereoscopic ophthalmoscopy without reflex which gives the maximal stereoscopic effect, hitherto unattained; a method of simplified ophthalmoscopy without reflex which enables the practitioner to examine the region of the macula even with a small pupil; and a method of simplified stereoscopic ophthalmoscopy without reflex with a stereoscopic effect sufficient for most cases in practice.

THURSDAY AFTERNOON, AUGUST 4TH. DEMONSTRATION SESSION, STOCK PRESIDING.

1. PURTSCHER (Klagenfurt): **Still unknown conditions in traumatism of the skull.**

Purtscher reported two cases of fundus changes after blows on the head. In one case there was a fracture of the base, in the other it was suspected. The peculiar condition described existed in the right eye of the first case, while in

the left there was a simple atrophy of the papilla with amaurosis from fracture of the optic canal; in both eyes of the second case. The observation was made in one case at the end of 3 weeks, in the other after 14 days. The picture was that of a great number of bright, white spots from ½ to 1 papillary diameter long and of variable breadth, with indistinct outlines, which followed the course of the veins and were situated in the innermost layers of the retina. There were no retinal or papillitic symptoms, but in the right eye there were numerous venous hemorrhages, including a large preretinal one. In both of the other eyes hemorrhages were almost completely absent.

The spots occupied for the most part the region between the papilla and the macula, the latter of which was free, though exhibiting coarse, washed out, grayish-brown points. There was no foveal reflex. The spots could be followed along the course of the veins 3–6 papillary diameters into the periphery. They were grouped by preference about the little veins and their branches coming from the macula.

The vision and the light sense were moderately reduced; the peripheral visual field and the color sense were normal. The urine contained neither sugar nor albumin. The course could be followed only in Case 2. The spots retrograded quickly and disappeared, leaving no trace. The papillæ were somewhat pale; the vessels smaller than normal. In the right were two slight atypical ruptures of the choroid. Temporally from the macula appeared a superficial formation of connective tissue. The condition may be called angiopathia traumatica retinæ.

It is certain that after a blow on the head a fundus change takes place which, at least in a certain stage about the third week, is characterized by typical bright, white, shining spots situated in the innermost layers of the retina along the course of the veins. Its origin is obscure, but is not retinitic. In literature there are but few, perhaps not one, analogous observation of similar spots. Their origin from hemorrhages is improbable; on the contrary the clinical symptoms as well as the anatomical and physiological facts favor the theory that they were lymphorrhages consequent upon suddenly increased pressure in the cavity of the skull produced by the

blow on the head, which drove a wave of the cerebrospinal fluid into the lymph sheaths of the retinal veins, whence lymphorrhages could arise, analogous to the venous hemorrhages likewise observed. The occurrence of these could not be prevented by the resistance of the intraocular tension as the hemorrhages positively prove.

2. WESSELY (Würzburg): Demonstrations. (*a*) **Pathology of the growing lens.**

Pictures and preparations were used to show the dependence of the growth of the eyeball upon the size of the lens, especially after the production of cataract in the newborn animal, and the origin of formations resembling central cataract through the growth of new, clear lens layers about the originally opaque small lens.

(*b*) **Experiments with indol in the eyes of rabbits.**

Wessely demonstrated the serious fundus changes which follow the injection of the least quantity of indol into the vitreous of rabbits. They consist at first of a marked swelling of the optic nerve with hemorrhages and retinal opacities, later of a high degree of paleness of the optic nerve with thread-like vessels. Similar changes may be produced by overfeeding with scarlet oil, as well as by injection of sterilized juice pressed from the contents of the intestine, complicated in the latter case by the cataract-producing action of the bile. The serious injury of the nervous apparatus of the eye by a product of the breaking down of albumin physiologically present in the organism opens up a new outlook in regard to the question of auto-intoxication.

3. GROENOUW (Breslau): **Visual-field chart with indicated color limits.**

From a great number of observations Groenouw has prepared a visual field for white, blue, red, and green. Colored cloths 5 and 10*mm* square serve as objects. Four different charts are made, one for each size of the object in two different sizes, the larger of which serves for the inscription of finer changes, *e. g.*, central defects, for which the ordinary charts are too small. The parallel circles are equally distant from each other as in Foerster's charts. Twelve meridians are indicated and numbered according to the international method of notation of the axes of cylindric glasses.

4. SEEFELDER (Leipsic): **Early stage of congenital hydrophthalmos.**

Child eight weeks old. Bilateral congenital hydrophthalmos. Size of eyeballs 18:18½:19*mm*, of the corneæ 11½:12*mm*. Fresh rupture of Descemet's membrane. Sinus of the anterior chamber wide open. Marked development of the scleral and uveal stroma. Ciliary muscle of the so-called fœtal construction. Various anomalies of the musculature of the iris. Almost total defect of Schlemm's venous circle. No inflammatory symptoms. The origin of the hydrophthalmos in this case lay in the congenital anomalies of the sinus of the anterior chamber without doubt.

5. SCHIECK (Göttingen): **A malformation of the eye.**

Schieck showed preparations of a peculiar malformation in which a piece of bone was situated on the wall of the eyeball and pieces of cartilage and of bone were scattered in the sclera. The patient had also congenital anomalies of the skin in the region of the eye and a tumor-like distension of the lid by lipodermoid. The cornea was also covered by a tissue in which could be recognized epithelial cones and an adenoid ground substance. The malformation was probably associated with a disturbance in the closure of the fœtal cleft.

6. SALZER (Munich): **Permanent healing in of preserved pieces of cornea implanted in the cornea of a rabbit.**

Salzer showed in several preparations the uncommonly slow course of the resorption of corneal flaps preserved in formol which had been implanted in the cornea of a rabbit. While the flaps at the end of three months showed resorption and substitution of corneal tissue only at the margins, at the end of seven months this process had advanced much farther so that the flaps presented the appearance of normal cornea at their margins. At the end of seventeen months the large pieces, several millimetres square, were so far resorbed and substituted that their remains could only be recognized very indistinctly in the corneal tissue.

He also showed preparations of total keratoplasty with preserved fish cornea. The flaps healed in apposition with the iris and showed after four weeks exactly the condition described by Neelsen and Angelucci. But the total keratoplasty succeeded also without apposition with the iris, as

was demonstrated on an eye operated on fourteen days before. The flaps were taken in this case from a fairly opaque, long preserved cornea and were not quite transparent, though more so than immediately after the operation. He has no doubt that transparency will be produced through gradual substitution of clear cornea, perhaps after many months.

7. FRAENKEL, JUN. (Chemnitz): **A binocular ophthalmoscope.**

The examination is made free hand of the inverted image with a convex lens and the apparatus shown. As the linear enlargement of the inverted image increases with the focal distance of the lens, the depth enlargement with the square of the focal distance of the lens used in the examination, the inverted image is greatly increased in comparison with its object, the fundus being examined. The bundles of rays coming from the point in the inverted image diverge too slightly to enable them to fall on the two eyes of the observer for the purpose of depth perception, so they are guided into the eyes by two pairs of totally reflecting prisms, as in Girard-Teulon's binocular ophthalmoscope. The prisms are in a longitudinal tube, the inner immovable, the outer movable on a guiding rod with right and left screws, always in perfect symmetry with the inner. The prisms are adjusted according to the pupillary distance of the observer and the divergence of the rays from the inverted image, the latter being dependent on the size of the pupil of the eye under examination and the focal distance of the lens employed; the nearer the prisms are to each other the better is the stereoscopic action of the instrument. In order that the marginal rays of the bundle, which are necessary for the plastic impression, may not fade off as in Girard-Teulon's ophthalmoscope, a horizontally divided concave mirror is placed in the middle for illumination, the halves of which move symmetrically and leave between them a free space through which the bundles of rays can enter the inner prisms without hindrance. The focal distance of the mirror is so chosen that an aërial picture of the light of the ophthalmoscope falls about in the focal plane of the examination lens. With greater breadth of the space up to 1*cm*, the illuminating bundles from the two halves of

the mirror lie so close together on the examined eye that the upper and lower areas of the pupil are well illuminated. The binocular examination of the upright image is impracticable without the aid of glasses which lower the refraction of the examined eye.

8. LINDNER (Vienna): **Trachoma parasites.**

Lindner showed preparations to demonstrate the different phases of development and kinds of increase of trachoma bodies from the so-called initial forms and elementary bodies to the completely developed forms. He considers the different forms to be stages of a still unknown cycle of development of a parasite which he believes to be the probable exciter of trachoma.

9. E. HERTEL (Strassburg): **Telescope lenses.**

Hertel exhibited the telescope lenses that were described in von Graefe's *Archiv*, Bd. lxxv., Heft 3.

10. STANKULEANU and RASVAN (Bucharest): **Experiments concerning mydriatics and miotics, particularly in the operation for senile cataract.**

The authors experimented with several mydriatics to produce the desired dilatation and afterward to counteract it with eserin. Their conclusions are:

1. The 1% solution of homatropin dilates the pupil sufficiently for the operation for senile cataract and the dilatation is paralyzed by a $\frac{1}{250}$ oily solution of eserin salicylate after the opening of the anterior chamber.

2. The duration, maximum, and beginning of dilatation vary in different persons. This variation seems to be according to a rule: In persons in whom the pupils dilate quickly the maximum is reached sooner, is greatest, and lasts longest.

3. The procedure of the authors in the cataract operation is as follows: During the evening before the operation two drops of a 1% solution of homatropin are instilled in the eye to be operated on. After the incision in the limbus a capsule forceps is used, introduced closed into the anterior chamber, then opened and the anterior capsule seized. Lateral movements are then made so that the entire lens in an unbroken capsule is dislocated into the anterior chamber and the forceps are then removed. The lens is delivered by means of two broad spatulas, one used to make pressure on the lower

margin of the cornea, the other to press back the upper margin of the wound. The lens is thus expelled in its capsule through the corneal wound and a drop of the $\frac{1}{100}$ solution of eserin salicylate is instilled. On the next day the pupil is contracted more than normally; sometimes another drop of eserin is instilled. On the second day the use of a weak solution of atropin is begun and increased up to 1%.

11. Morax (Paris): **New cases of mycosis of the apparatus of the eye.**

Morax demonstrated the following cases: In a young woman a slight infiltration of the tarsal conjunctiva of the left eye with yellow spots and small superficial ulcerations was observed. The eye lachrymated and was a little sensitive. The preauricular glands were swollen. The diagnosis of spirotrichosis was made by culture. The infection was cured in three months with potassic iodide.

A man 52 years old had suffered for three weeks from an inflammation of the lower lid of the right eye which was accompanied with very little pain, but extended far into the orbit in relation with the wall. Thick yellow pus mixed with a little blood was obtained by puncture, in which only the sporothrix Baumanni was found by culture, as in the first case. The patient refused treatment and the inflammation progressed.

He also showed a case of mycosis of the cornea caused by a kind of verticillium. The patient was a man 40 years old whose eye became inflamed without known cause. More than ¼ of the cornea was covered by a white spot and there was a small hypopyon. The exudate peeled off like a pseudomembrane, and was found under the microscope to be composed of mycelia. Cultures revealed only colonies of hyphomycelia and xerosis bacilli. The fungus had the nature of the verticillium and this mycosis is very different clinically and etiologically from that caused by aspergillus. The infection was easily brought to a standstill with the galvanocaustic.

12. Vossius (Giessen): **Demonstration of a microscopic preparation of an eyeball with irido-cyclo-choriodialysis.**

The eye was that of a miner who had been injured in a dynamite explosion. When he entered the clinic there was

a laceration of the left lower lid, an injury of the sclera together with the lower, outer margin of the cornea, and a hemorrhage into the anterior chamber. After absorption of the blood the anterior chamber appeared to be much changed in form and depth. The iris was attached at the corneo-scleral margin only to the outward side and below; elsewhere it was torn away and hung completely relaxed backward and outward at an angle of 45° to the base of the cornea. The ciliary processes were not visible. The diagnosis made was: Escape of vitreous and lens through the perforation in the sclera; avulsion of the iris together with the ciliary body and the anterior portion of the choroid from the inner wall of the eye. The eye was enucleated five years after the injury. The diagnosis was confirmed by the microscopic examination.

13. KRAUSS (Marburg): **A ganglioneuroma of the lid.**

Krauss described the clinical and pathological condition of a hitherto undescribed tumor of the lid which he had removed from a 15-year-old boy, otherwise healthy. It was a typical ganglioneuroma, consisting of proliferated, probably sympathetic nerve fibres and ganglion cells. The tumor was a small nodule composed of separate cords enveloped in a thin connective-tissue capsule; delicate connective-tissue septa ran about within it and gave the tumor a somewhat lobulated construction. The mass was chiefly composed of non-medullated nerve fibres running in all directions with some medullated fibres amongst them. Most remarkable was the presence of numerous ganglion cells, which differed in size, form, stain, pigmentation, and nuclei. The cells were enveloped in connective-tissue capsules and exhibited processes. Extensive changes in the nucleus and protoplasm, vacuole formation, etc., indicated processes of proliferation or degeneration.

14. BRUECKNER (Königsberg): **Demonstration of microscopic preparations of syphilis of the eye.**

Discussion: LAUBER saw complete atrophy of the eyeball and optic nerve follow a gumma of the eye.

15. HEGNER (Breslau): **Trachoma.**

Hegner demonstrated preparations of follicles of the con-

junctiva of monkeys in whom trachoma had been produced experimentally. The pathological condition coincided almost exactly with that in human trachoma.

16. v. IMRE (Budapest): **Pathological anatomy of the subretinal bands in detachment of the retina.**

Cord-like formations can be seen in the subretinal space. These cords are compact only in the neighborhood of the pigment epithelium, elsewhere in the subretinal space they form tubes. In the middle lies a homogeneous mass rich in cholesterin crystals; about these crystals are gross clumps of pigment and desquamated epithelial cells, then comes a layer of spindle cells or fibres, which has the properties of a connective tissue rich in intermediate substance. The whole is again partly covered with pigment epithelium. The adventitia of the retinal vessels is not connected with the connective-tissue mantle of the cords. As the elastic lamina was defective only in two quite circumscribed places, because the pigment epithelium in the entire eyeball showed a very great tendency to tube-shaped proliferation, and because we know that tissue of epithelial origin can show connective-tissue staining, it cannot be excluded that the connective-tissue part of the cords originated from the pigment epithelium.

The first start of the cord formation may be sought in a clot, which enclosed cord-like the cholesterin of the exudate, that was uncommonly abundant in this case; the organization followed mainly from the pigment epithelium, perhaps also from the connective tissue. As the cords reach to a part of the posterior surface of the retina, and as they are plainly capable of contraction, it may be that they take an active part in the replacement of the retina in such cases.

17. BJERKE (Linköping): **A new diploscope.**

The screen and the table for the object are movable on a rod graduated in centimetres. The screen has two apertures, from 30 to 60*mm* apart. The opening of the apertures may be regulated by a diaphragm. A millimetre scale is placed over the openings. The objects, letters, are changeable. On the table are two millimetre scales, one horizontal, the other vertical. The apparatus has a contrivance by means of which latent deviations of the eyes can be measured, using the principle of screening the one eye from what the other

sees. A right-angled disk that can rotate like the diploscope screen is affixed to the screen. To measure vertical deviations the disk is placed vertically and a print is used having a vertical scale and a horizontal little arrow. The disk is placed so that one eye sees the scale and the other the arrow and the patient states to what number the arrow points. For the measurements of horizontal deviations the disk is placed obliquely and an oblique scale 15° from the horizontal is used.

18. POLACK (Paris): **Stereoscope with variable prismatic ocular.**

Polack exhibited a stereoscope in which each ocular was composed of a double convergent prism the strength of which can be changed from 0 to 30°. By this arrangement stereoscopic figures of one and the same breadth, *e. g.*, 60*mm.*, and fusion are obtained much more easily than with the classical stereoscope. When the fusion of the images has been obtained it may be maintained while the prisms are moved and in this way convergence may be modified. It affords excellent practice in order to develop this independence between accommodation and convergence in strabismus. He also outlined some physiological questions, chiefly of a speculative nature, which may be solved with the aid of this instrument.

19. REIS (Bonn): (*a*) **Angioma choroideæ.**

Reis showed preparations of an eye in which a bluish-gray elevation of the retina at the upper-inner margin of the papilla had been seen to grow slowly in the course of several months of continuous observation, and had been diagnosed as a sarcoma of the choroid. The histological examination of the enucleated eye revealed an extensive, scale-like cavernous angioma of the choroid that extended from the upper-inner margin of the papilla almost to the ora serrata and could not have been recognized with the ophthalmoscope. The bluish-gray protrusion was caused by consecutive changes in the retina which were present over only a small section of extensive angioma and consisted of a cystoid degeneration of the retina, with a slight detachment of the latter, and the formation of an epithelial plate coming from the pigment epithelium on the surface of the angioma. The observa-

tion shows that there is no characteristic ophthalmoscopic picture of the angioma of the choroid as such.

(*b*) **Flat sarcoma of the choroid with sympathetic inflammation.**

The preparations shown were taken from the left eyeball of a man 65 years old in whom a sympathetic ophthalmia of the right eye occurred about two months after an anterior sclerotomy had been performed on the left to relieve a painful increase of tension. The entire posterior portion of the enucleated eyeball was found to be lined with a diffuse sarcoma of the choroid with separate small necroses, conditions secondary to an old plastic inflammation, and extremely sparse foci of typical sympathy exciting infiltration. This latter can have originated only endogenously independently of the operative opening of the eyeball.

20. HARMS (Tübingen) exhibited plates and drawings to illustrate the **pathology of the proliferative diseases of the retina.**

FRIDAY, AUG. 5, 9 A.M. SECOND SCIENTIFIC SESSION, V. GROSZ PRESIDING.

11. WESSELY (Würzburg): **Tuberculosis of the conjunctiva.**

The case was one that presented the clinical picture of Parinaud's conjunctivitis. A 7-year-old child had an acute swelling of the right upper lid with marked swellings of the lymphatic glands in the neighborhood. Locally a papillomatous proliferation larger than a lentil was present in the palpebral conjunctiva together with a row of yellow nodules. The course was of long duration, but benign. The microscopic picture of the material excised for examination was that of tuberculosis, but no bacilli were found. The diagnosis was made positive by transmission experiment. In the first series the subconjunctival inoculation in monkeys produced a disease of extreme severity: incubation of 2–4 weeks, then acute development of great papillomatous proliferations in the transition folds with marked swellings of the lymphatic glands, later perforation through the lid followed by ulceration of the skin which destroyed a large part of the side of the face, finally death with metastases in the liver, spleen,

and peritoneum. Microscopically the condition was little characteristic, but tubercle bacilli were demonstrable everywhere. Further inoculations in monkeys always produced the same picture only somewhat softened down; inoculation at the height of the disease of the other eye proved negative. Transmission experiments to the conjunctiva of rabbits and cats did not succeed, but in the anterior chamber of rabbits and in the abdominal cavity of guinea-pigs inoculation produced tuberculosis.

It has thus been shown that conjunctival tuberculosis may run its course presenting the clinical picture of Parinaud's conjunctivitis and certain peculiarities favor the theory of an infection through tubercle bacilli of bovine origin. The extraordinary receptivity of the monkey's conjunctiva makes it desirable in the future to employ subconjunctival transmission experiments on monkeys in place of the inoculations of the anterior chamber in rabbits, as from them new insights into the different forms of conjunctival tuberculosis may be hoped for.

Discussion: BRUECKNER had seen a child with typical Parinaud's conjunctivitis that was tuberculous. Bovine tuberculosis was suspected because the child came into contact much with cows.

12. KRUSIUS (Marburg): **Biological studies concerning the lens albumin and its relations to other naturally denatured albumins of the ectoderm.**

Krusius reported concerning the experiments he had undertaken to explain the nature and the cause of the biological peculiarity of the lens. The results are thus summarized:

1. The albumin of the lens is biologically active as an albumin foreign to the blood, yet it has a weak biological action like the blood serum, *i. e.*, the organ-specificity of the lens albumin is only relative.

2. The particular action of the lens albumin differentiated from the kind of animal (organ-specific) appears rather in the nuclear portion, the action of that related to the kind of animal (species-specific) in the capsule and cortical layers of the lens.

3. The organ-specific action of the lens albumin is not

absolutely one and the same, but only relative, and seems to play an important part in the material chemical structure independently of the embryonal relationship, because there are closer biological relations between the lenses of the cephalopods and of the shell fish than between these and the lenses of cattle.

4. Antigen albumin is also contained in the ectodermal horny formations, such as the nails and the hair.

5. These ectodermal horny formations also act as antigen against the same species of animal.

6. The albumin of the ectodermal horny formations exhibits besides an action the same as that of the blood serum in question.

7. Thus there exists in the ectodermal horny formations, just as in the lens, an organ-specificity together with a species-specificity.

This biological differentiation shows very important relations between the lens and the horny formations, as indicated by the well-known clinical relations.

This peculiarity of the lens and of the ectodermal horny formations demonstrable through the biologic reaction is to be explained as a natural denaturation produced during development of an albumin at first species-specific in the mother cell.

13. ROEMER (Greifswald): **Should organotherapeutic attempts be prosecuted in commencing senile cataract?**

Roemer says that the fluctuations of vision at first observed are to be explained by the lack of collective tables. True improvements of the vision, particularly in subcapsular senile cataract, are met with, but as these improvements occur spontaneously an improvement is not therefore to be expected from organotherapy. Opacities remain unchanged and their disappearance is not to be expected from this form of treatment. No influence has been observed to be exerted upon the course of a nuclear cataract. The punctate cataract also remains unaffected. Therefore only cases with subcapsular opacities are to be taken into account in the organotherapeutic experiment. But it is still uncertain whether a real inhibition can be produced in the development of a commencing subcapsular cataract. A comparison with un-

treated cases shows only that the number of the treated cases that advanced farther was on the average smaller than that of the untreated ones. He considers further investigations justified to decide this sole remaining question. The difficulties of the research are thus summarized: First, the material is too small; second, such differences can be present without any therapeutic attempt; third, cataracts in the same region may behave differently; fourth, progressive forms are found among the still uncontrolled cases; fifth, the time of observation is too short.

14. GROENOUW (Breslau): **The action of atropin and eserin upon the cadaveric eye.**

The question whether atropin and eserin continue to affect the pupil after death is difficult to answer because of the changes that the size of the pupil undergoes during normal rigor mortis. At the moment of death the pupil dilates and then it gradually contracts during the following day or two. In order to exclude confusion with the normal rigor mortis of the pupil, Groenouw dropped atropin into one eye in a number of cadavers and eserin into the other and found that after a quarter of an hour there was a slight difference in the size of the pupils that became very distinct in from ½ to 1 hour. The pupil of the eye treated with eserin was always much smaller than the one of the eye treated with atropin; the one had a diameter of 2 to 3*mm* during its greatest contraction, the other a maximal diameter of from 5.5 to 8.5*mm*. The effect lasted from seven to nine hours, after which came the normal course of rigor mortis in which the eserin pupil gradually dilated and the atropin pupil contracted. Yet after twenty-four or more hours a distinct difference in the size of the two pupils was present. These drugs act with fair certainty if instilled three or four hours after death; later they produce no effect. The observations may be of value in legal medicine in order to determine the time elapsed since death.

15. v. GROSZ (Budapest): **Optic atrophy caused by methyl alcohol poisoning.**

E. v. Grosz reported 10 cases of optic atrophy caused by methyl alcohol. The majority of the patients, all adults, had drunk rum adulterated with methyl alcohol, and not

more than one or two spoonfuls in tea. Blindness followed within a few hours or days and in a few weeks the picture of optic atrophy was presented. At the same time seventy fatal cases of methyl alcohol poisoning had been observed in Hungary. The methyl alcohol could be demonstrated in the organs and urine of the cadavers. In view of this, that even very small quantities can cause serious poisoning, the medicinal use of methyl alcohol must be avoided, least of all should it be used as a solvent for drugs to be used for injection, as has been recommended in the case of Ehrlich's preparation of arsenic. As regards the cause of the blindness the writer is of the opinion that the poison seizes upon the ganglion cells of the retina and that the atrophy is ascending, the same as in fern poisoning, or as in tabetic atrophy. The clinical symptoms correspond with the results experimentally produced by Birch-Hirschfeld.

16. BARTELS (Strassburg): **Concerning nervous tracts between the apparatus of the ear and the musculature of the eyes.**

Bartels investigated to ascertain how far the ocular movements, rotation nystagmus, thermic nystagmus, set up by the ear depend on a contraction or relaxation of certain muscles. He dissected free the externus and internus in rabbits. After removal of the eyeball and the other muscles of the eye he recorded the movements of these isolated muscles which were made mechanically independent of each other, partly during and after whirling on a rotating disk, partly after thermic stimulation of the ear. The curves showed that both in the slow and the rapid phase of a nystagmus a contraction of one muscle was simultaneous with a distinct relaxation of its antagonist. These observations indicate the existence of a constant ocular muscle tone from the ear, as otherwise a relaxation of a muscle from the ear could not be explained. Other curves taken from an isolated muscle show that a single muscle may produce nystagmus in both directions. The contraction plays the principal part, the active relaxation ceases first in narcosis while contraction is still clear. The conditions in this study are similar to those the writer found in premature births. The rapid phase first ceases completely in deep narcosis, as the

curves show, contrary to the appearance. The thermic nystagmus to one side corresponds graphically exactly to the rotation or after nystagmus in the same direction. The muscle contraction or relaxation in the slow phase, which is excited from the labyrinth, increases gradually; on the contrary, the muscle movement in the rapid phase is flash-like, thus completely different, which goes to show that the rapid phase is not excited from the labyrinth. A peripheral excitation of the second phase can exist only in the contracted or relaxed muscle itself, because the muscles were completely isolated in the experiments. The rapid phase always starts at the height of the slow phase, at any rate not near its termination.

17. FLEISCHER (Tübingen): A **hitherto unknown general disease associated with greenish discoloration of the cornea.**

Of the three cases of peripheral greenish discoloration of the cornea described by Kayser or Fleischer, to which only one other case has been added by Salus, two have come to autopsy. Fleischer's investigations have shown that the discoloration of the cornea is a local phenomenon of a general pigmentation of the body which particularly involves the sclerosed connective tissues, such as the membrane of Descemet, the vitreous membrane of the choroid, the basal membrane of the renal tubules, and the sarcolemma of the muscles, but is to be found also in other connective tissue and the blood. This pigment is peculiar in that it is one which does not give the iron reaction as would be expected, but is a material easily soluble in ammonium sulphide. The serious nervous lesion accompanying the discoloration of the cornea, characterized by a marked tremor, is not a multiple sclerosis, as Fleischer formerly thought, as the histological examination revealed normal conditions throughout. Aside from the extensive pigmentation of the body the following conditions were found: cirrhosis of the liver, enlargement of the spleen, and, at least in the late stages, diabetes. The disease is one hitherto unknown, but well defined, which in some points resembles diabète bronzé, but differs from it in very important particulars.

18. FRANKE (Hamburg): **A peculiar form of superficial keratitis.**

Franke described a very rare form of keratitis which resembled in its clinical course the so-called recurrent traumatic erosion of the cornea, but could be differentiated from it by the absence of a precedent traumatism, by its obstinate resistance to therapeutic efforts, and by the microscopic condition of the detached epithelium. Although the ballooning degeneration of the epithelium is found in this disease, only transient signs of degeneration of the nuclei are seen, even when the disease has lasted a long time. Franke raises the question whether there may not be a certain connection between this disease and the physiological desquamation of the corneal epithelium.

19. W. UHTHOFF (Breslau): **Pathogenesis of visual disturbances in deformities of the skull.**

This paper relates only to some important points that have been discussed in recent years. First the importance of the X-ray diagnosis is discussed. Principally two important conditions come up for discussion. First, the so-called impressiones digitatæ and the deformation of the anterior portion of the base of the skull with shortening of the orbits and frontal position of the great wings of the sphenoid as the cause of the exophthalmos usually present. Both symptoms prove that a great increase of pressure took place, at least sometimes, in early life, which explains the onset of the trouble in the optic nerve, usually a choked disk. The X-ray can also definitely answer the question whether primary microcephalus with secondary smallness of the skull-cap is present, or a primary premature obliteration of the sutures with secondary deformation of the skull and abnormal compression of the brain.

Uhthoff then exhibited a number of deformed skulls, particularly oxycephalic, and showed the characteristic deformation of the base of the skull. He called especial attention to one loaned him by G. R. Ponfick, of a 17-year-old boy with completely ossified sutures and early blindness from optic atrophy, high-grade impressiones digitatæ, and very marked deformation of the base of the skull.

He then discussed the great contraction of the optic canal described by some authors as the cause of the visual disturbance; but he believes that this is not the rule. The

discussion of this question is important relative to operative intervention.

The theory of an original meningitis as the cause of the visual trouble he believes to be incorrect for the majority of cases for various reasons. The frequent presence of a hydrocephalus internus would be more explainable in consequence of the intracranial increase of pressure, but one needs to assume no serous meningitis in the true sense. The chief factor in the production of the visual disturbance is the mechanical conditions consequent upon the intracranial increase of pressure.

Finally he considered the question of operative intervention and emphasized the importance here of the X-ray diagnosis. Operative intervention should be considered only before the age of 7, later when the optic-nerve trouble is stationary it could scarcely be justified.

FRIDAY AFTERNOON, AUG. 5th. THIRD SCIENTIFIC SESSION, BIRCH-HIRSCHFELD PRESIDING.

20. BEHR (Kiel): **The origin of the changes in the optic nerve in oxycephalus.**

Behr reported a case of oxycephalus with neuritic optic atrophy in a man 60 years old that he had examined both clinically and anatomically. The patient had typical amblyopia and contraction of the visual field without other general or nervous disturbances. At the autopsy a complete constriction of the highly atrophic optic nerve was found in the optic canal, produced not by a stenosis of the bony canal, which was of normal height on each side, but by an abnormal entrance within the canal of the internal carotid. The posterior margin of the upper wall, with a duplicature of the dura prolonged on it toward the cerebrum, projected a considerable piece backward over that of the lower wall. In addition both walls inclined toward each other backward to form an acute angle. The carotid turned backward beneath the projecting upper wall and so formed the continuation of the bed of the bony canal, giving rise to a serious stenosis. The same conditions were present in another case of oxycephalus with optic atrophy: normally large bony canal, protrusion of the upper over the lower wall, and entrance of the carotid

into the optic canal causing a relative stenosis. According to the view of the writer this constriction must close the lymph channels running toward the cerebrum both in the trunk and in the sheath of the optic nerve and in consequence must result in a choked disk. The nerve itself answers to this concentrically acting pressure with an atrophy at first in its peripheral bundles (concentric contraction of the visual field) which must advance until through diminution of its diameter the nerve is no longer exposed to severe pressure. At this moment with the freedom of the lymphatic circulation begins the retrogression of the ophthalmic symptoms and the stationary condition of the subjective troubles. This explains the clinical experience that amaurosis is rare in oxycephalus.

The writer had also made investigations concerning the cerebrospinal pressure in oxycephalus and had performed lumbar puncture. In all the cases, 9, the lumbar pressure was increased, in some cases markedly. The fluid was always of normal composition. No relation was demonstrable between the pressure and the changes in the optic nerve. The increase of pressure was present both in old cases that had been stationary for ten years and in fresh cases with advancing choked disk. The pressure was very high in one case of typical oxycephalus without pathologic fundus changes. He thinks therefore that this increase of pressure is to be looked on as the predisposing rather than the actuating cause of the changes in the optic nerve, particularly as in choked disk due to brain pressure from other causes an amaurosis accompanies the atrophy, while in oxycephalus amaurosis is rare. He cautions, therefore, because of these anatomical conditions, against palliative trepanation, which he considers justified only in the very rare cases of fresh choked disk of high degree in which other general symptoms referable to an increased compression of the brain indicate the operation.

21. PETERS (Rostock): **Malformations of the face occurring with proboscis formation (Ruesselbildung).**

Peters discussed, on the basis of a case he had observed, the different possibilities that may account for the so-called proboscis formation in man. While in most of the cases quoted the proboscis was inserted in the inner side of the orbit, in Kundrat's case and in his own the insertion was in

the outer part of the orbit. In this case the absence of the eyeball, the presence of a coloboma of the lid, and the interposition of a broad plate of bone between the root of the nose and the left orbit were worthy of note. The last condition he ascribed to an encephalocele, or meningocele, which Kundrat likewise considered answerable for the cause of the malformation in his case, as well as the cause of the atypical fissures of the face. As in the writer's case the left half of the nose was wanting it must be assumed that the meningocele prevented not only the foundation of the left eye, but also of the left half of the nose, which develops from the neighborhood of the so-called nasal fossa, while this itself is otherwise differentiated. This isolated development of the nasal fossa without involvement of the neighboring parts forming the frontal or nasal processes lies at the base of the proboscis formation present in cyclopia, only with the distinction that here the proboscis came from the common foundation of both nasal fossæ.

If the proboscis is situated in the nasal part of the orbit several causes may operate for the isolated development of the nasal fossa. Thus Kirchmayer's case admits of the same explanation as Kundrat's, as the nasal fossa and the parts appertaining to the external nose were separated by a meningocele which simultaneously caused an atypical fissure of the face, while in Selenkoff's case there was a defect in the formation of the frontal lobe of the brain whereby only the nasal fossa, but not the nasal processes, developed on the corresponding side.

The simultaneous appearance of colobomata of the iris and lids in several of these cases is notable. They indicate, like the absence of the eyeball in the author's case, a very early period for the starting of the different malformations.

22. SEEFELDER (Leipsic): **Coloboma of the eyeball with proboscis formation (Ruesselbildung).**

Two cases of a rare malformation with the following characteristics in common: Rudimentary development of one half of the nose, presence of a trunk-like formation on the same side, which sprang from the region of the root of the nose and allowed the escape of tears when the child cried, and a coloboma of the eyeball on the same side. In the case that

came to autopsy there was a bending of the crista galli of the ethmoid to the side of the proboscis with a total defect of the olfactory nerve and of the foramina cribrosa of the ethmoid. The condition of the brain was otherwise normal. In the trunk was a well developed lachrymal gland. Some almost analogous cases quoted from literature taken in connection with these cases show that this is a typical malformation which is the same in principle as the median nasal fissure. The etiology is dark—most likely it is due to an anomaly of the germ; the typical behavior of the malformation contradicts the idea of influence exerted on the part of the amnion.

23. SCHIECK (Göttingen): **Experimental studies concerning the genesis of the choked disk.**

Schieck has found his theory of the origin of choked disk confirmed by the examination of two more fresh cases: not the slightest sign of inflammation was present, but there was marked distention of the perivascular lymph sheaths in the axial cord and œdema of the papilla coming from the hilus. He also succeeded by filling the spaces between the sheaths of cadaveric eyes with chrome yellow gelatine, in compressing the cerebrospinal fluid into the tract of the axial cord along the central vessels of the retina, in distending the perivascular lymph spaces with fluid, and in elevating the physiological excavation of the papilla by a transudate in the hilus. Introduction of distending material in animals produced no different result. On the contrary, the distinct picture of the choked disk appeared in monkeys when a physiological salt solution was injected under pressure into the skull, while the result was negative when stiff paraffin was used instead of the fluid, although in this experiment the animals died from the pressure on the brain. He concludes therefore that the raising of the intracranial pressure alone cannot induce a choked disk, but that there must be at the same time an increase of the cerebrospinal fluid, a hydrocephalus internus or externus. This increase of fluid enables the intracranial pressure to be transmitted to the optic nerve head.

Schieck also demonstrated that when fluid was injected into one side of the skull the fundus on that side showed a choked disk sooner and more markedly than that on the

other side. This authorizes the conclusion as to the localization of circumscribed affections within the skull from the difference in the intensity of the process arrived at clinically by Horsley.

SATURDAY, AUG. 6TH, 9 A.M. FOURTH SCIENTIFIC SESSION, PURTSCHER PRESIDING.

24. M. VON ROHR (Jena): **Gullstrand's cataract glasses, with special reference to the correction of post-operative astigmatism.**

As it is impossible to correct satisfactorily a positive spherical lens of high refractive power for oblique rays we are led to the introduction of an aspherical surface, as has been claimed for a long time by A. Gullstrand. In spite of absolute slight deviation from the spherical surface a marked improvement of the correction of oblique rays is possible, and such glasses, made with one or two aspherical surfaces, should be termed Gullstrand's lenses. As one must count on a post-operative astigmatism in an aphakic eye, which with the present methods can be corrected in the axis but not for oblique turnings of the line of vision, a fairly extreme case may be supposed in which the refraction in one meridian is 13, in the other 7 dioptries. Calculation of the astigmatism through the different principal rays of final inclination (endlicher Neigung) in both principal meridians proves that with the ordinary sphero-cylindric lens it varies greatly with the obliquity of the vision through the lens, while it is practically constant with the new Gullstrand lenses. Photographs confirm the result of this calculation and amplify it in so far as it enables us to perceive that the impression upon the retina of the eye looking through the glass is satisfactory even when the plane passing through the axis of the lens and the line of vision forms an angle of 45° with each of the two meridians.

The greater completeness of the impression and the difficulty in shaping must correspond to the care exercised in the adaptation of the glasses. The physician should oversee the work of the optician. The glass must be centred in front of the eye and when looking directly forward the vertex of the cornea should be about 12*mm* from the inner surface of the glass.

25. LANDOLT (Paris): **Correction of the foreign words used in ophthalmology.**

Landolt desired the appointment of a commission to correct tbe foreign words used in ophthalmology and proposed the names of Hirschberg and Jacovides to serve on the commission.

26. STARGARDT (Kiel): **The pathogenic qualities of the xerosis bacillus.**

Stargardt instituted comparative studies concerning the pathogeneity of the xerosis bacillus with four common stocks in monkeys, rabbits, guinea-pigs, and cats. Injections of thick emulsions of the bacteria into the vitreous caused severe purulent inflammations in all the animals. When only small quantities were injected, rabbits, guinea-pigs, and cats showed only circumscribed whitish clouds in the vitreous, while in monkeys fibrino-purulent inflammations were set up. Injection of extremely small quantities produced in monkeys a typical serous iridocyclitis with ever recurring precipitates of eight weeks' duration; in all the other animals it produced no symptoms. In all the animals the xerosis bacilli died in from 24 to 48 hours. In the cases of purulent inflammation in monkeys they could still be demonstrated at the end of two or three weeks, in the cases of chronic inflammation after eight weeks.

From his experiments he concludes that the xerosis bacillus is to be taken into account in man as an exciter of chronic inflammations, particularly after operations and injuries. He has found it in man once as the exciter of a panophthalmitis and twice in eyes inducing sympathetic ophthalmia.

Injections into the veins or arteries of monkeys and rabbits were productive of no result.

27. WOLFRUM (Leipsic): **The inclusion diseases of the human conjunctiva.**

The microscopic examination of ten inclusion blennorrhœas has shown that the disease differs in many points pathologically from the gonorrhœal ophthalmia of the new-born, through the special kind of epithelial disease and the plasma-celled infiltration of the subepithelial tissue, which under certain circumstances is of high degree.

On the other hand, it showed marked resemblances to the

trachoma of adults in the behavior of the epithelium and the great plasma-celled infiltration. Yet the inclusions in inclusion blennorrhœa are in general more abundant than in trachoma. Only in true, severe, neglected trachomas can a like quantity of inclusions be found.

There is still a greater difference from trachoma in the absence of any follicle formation. The normal conjunctiva contains during the first months of life no adenoid tissue and it is therefore probable that in inclusion blennorrhœa follicle formation is difficult because the conjunctiva of the new-born is not yet capable of it. Still he reports a case of persistent disease in which the first follicle formation was observed six weeks after birth, a very early period in comparison with normal conditions. It is therefore probable that inclusion blennorrhœa and trachoma are etiologically identical diseases.

28. H. Herzog (Berlin): **Etiology of trachoma.**

The writer elucidated by means of preparations, cultures, and pictures the elements differing morphologically and biologically from the normal forms to be observed in the involution of the gonococcus, which he differentiates chiefly as null forms, karyokinetic forms, and microgonococci; demonstrated the same forms in the cell inclusions in trachoma, the production of trachoma granules induced by him experimentally by inoculation of the human conjunctiva with a pure culture of gonococci as of microgonococci enclosed within the leucocytes, and came to the following conclusions:

1. The evidence offered concerning the nature of the elements of the cell inclusions met with in trachoma as involutional forms of bacterial germs—Gram-negative diplococci—confirms the doubtful theory of Greeff that the organisms that excite trachoma are of the nature of protozoa or chlamydozoa.

2. It cannot be denied that other germs more or less nearly approaching the gonococcus, and like it easily and quickly capable of undergoing involution in the mucous membrane and in culture, may give rise to cell inclusions like those in trachoma bodies. All of the facts presented taken together indicate strongly that in trachoma itself the gonococcus of Neisser is to be considered as exclusively the

original occasion of the formation of the cell inclusions. The limitation of the specificity of the gonococcus, in the sense used by Axenfeld, is also therefore of the greatest importance in the pathogenesis of trachoma.

3. In a number of cases of fresh trachoma Gram-negative diplococci can be directly demonstrated together with the involution forms. Still their presence is not necessary as a preliminary condition to the occurrence of the involution forms in the same case, as the writer shows that the involution forms directly proliferate as such, or may be transmitted as such from another place in the complete absence of normal germs.

4. Both the weakened normal gonococci and the involution forms produced during life are incapable of cultivation. There is therefore almost no possibility of demonstrating the presence or absence of the former in a mucous membrane when they are too few to be revealed in a smear. Consequently at the present time it cannot be told how often the involution forms in trachoma are accompanied by normal, though weakened, germs.

5. An injurious or destructive influence of the infection upon the epithelial cells cannot be excluded in all cases. The formation of foci of fusion, the increase of germs within the same leading to the formation of colonies, the access of specific cell secretion from the nuclear substance (plastin) modify the picture of the epithelial cell infection as compared with the leucocytic infection. A nucleus infection seems to result only in the way of a fusion extending from the surface of the nucleus and in addition to degenerative changes of the nucleus.

6. The method of the transmission of toxins, the closely related nature of the origin of chronic proliferative inflammation in the connective tissue of the mucous membrane, need further investigation, particularly in view of the infection of wandering cells with microgonococci established by the author, which underlies an extending regressive metamorphosis without involvement of the cytoplasm of the leucocytes.

29. F. GRADLE (Chicago): **Diagnostic and prognostic importance of lymphocytosis in traumatic iridocyclitis after perforating injuries.**

The anatomical examination in sympathetic ophthalmia led the author to count the different leucocytes in the circula-

tion. He found that in a case of traumatic iridocyclitis, clinically suspected of being sympathetic, the mononuclear blood corpuscles were increased from 20 to 80% at the cost of the polynuclear. A further increase showed itself on the day before each clinical exacerbation. After the enucleation the blood became normal again within two days. Six such cases had been examined, all with a lymphocytosis of from 30 to 45%. On the other hand, the blood was normal in 11 cases of perforating injury which either recovered or were enucleated on account of panophthalmitis; the same was true in 13 cases of non-traumatic iridocyclitis.

Discussion: GRADLE stated that he had never observed an increase of eosinophiles.

30. SALZER (Munich): **Regeneration of the cornea in rabbits.**

The investigations were made concerning the regeneration, in 26 perforating trephine wounds *2mm* in diameter, with and without apposition of the iris in the various stages, of an almost equally large number of non-perforating trephine wounds, and of a number of penetrating and non-penetrating incised wounds of the cornea. The results obtained were demonstrated by means of a great number of photographs. The conclusions of the author were as follows:

1. There is a true regeneration of the cornea.
2. The part most difficult of regeneration is Descemet's membrane.
3. The process runs its course without involvement of the blood-vessels and is thus quite different from regeneration with apposition of the iris.
4. The cells from which the new fibres of the cornea proceed after from two to four weeks appear first close beneath the epithelium, which is extremely active during the whole process. The accumulation of epithelial cells in the region of the wound takes place through displacement, or wandering over from the margin, and through amitotic cell division. Mitoses are rare.
5. The fixed cells of the cornea remain passive and are destroyed at the margin of the wound.

6. The involvement of the endothelium in the cell proliferation and the wandering over of fibroblasts from the iris are incidental.

7. If the cells forming the cornea proceed from the wandering cells, the question remains open why these elements heap themselves under the epithelium from the beginning and press out from there, while in other conditions, especially in inflammation, they emerge everywhere in the cornea with the greatest ease.

8. If the cells are derivatives of the epithelium, the specificity of the germinal layers is contradicted.

9. The answer to these questions is to be expected from a study in comparative anatomy that has already been begun.

Discussion: LOEHLEIN has determined by experiments concerning the capacity of the cornea to regenerate that the regeneration on the part of the cells of the cornea is extremely slow. If the cornea is normal the defect will be filled with clear tissue, but if the cornea is opaque from the presence of scar tissue the defect will be filled with dense cicatricial tissue.

31. LOEHLEIN (Greifswald): **Transplantation of the cornea.** Loehlein reported a new procedure for partial transplantation of the cornea. Its primary purpose is to improve the vision in cases with extensive leucomata, but it may be of good service for cosmetic purposes. The proposition is based on numerous operative experiments on animals which have shown that the procedure may be said to be easy of technic and its application to the human eye successful.

The operation consists of the removal of a broad, right-angled flap of cornea reaching from the upper to the lower limbus and involving a portion of the sclera and a tag of conjunctiva both above and below. The lateral delimitation is secured by means of a double knife the blades of which are separated 5, 6, or 7*mm*. After this instrument has been drawn from the upper to the lower limbus without perforating the cornea the corresponding tag of conjunctiva at the upper end is dissected up, seized with a suitable forceps, and then the right-angled central portion of the opaque lamellæ is dissected free with a thin cataract knife down to the lower

limbus where it is removed together with a bit of the conjunctiva. The flap must be thicker or thinner according to the depth of the opacity. The defect thus produced is covered with a flap of transparent human cornea obtained in exactly the same way, which is secured in place by two or three sutures above and below.

The advantages of the procedure are:

1. Good nutrition of the flap in the normal way in consequence of the large surface of contact and the quick union of the tissues at the limbus above and below.

2. The consequently slight, or at any rate not stormy, degenerative changes and the correspondingly moderate reaction on the part of the surrounding tissues.

3. Faultless fixation of the transplanted tissue without injury to the same by sutures. No danger from closure of the lids.

4. The great extent of the flap permits the hope of some benefit even when deep-seated opacities remain in places, or some parts of the flap do not remain clear.

Loehlein demonstrated the healing of such a flap with preservation of almost complete transparency in a patient on whom he had performed the operation a year before because of extensive corneal cicatrices. The vision was improved from $\frac{1}{60}$ to $\frac{4}{30}$. He also exhibited microscopical preparations showing the healing-in of flaps in experiments on animals.

32. LENZ (Breslau): **Studies concerning the visual centre.** Lenz has investigated the question whether the visual centre may be identified with the circumscribed region of the so-called "calcarine type" (hippocampus minor?). An earlier critical review of clinical and anatomical material had made this very probable to him. To solve the question he chose the study of the secondary degeneration in lesions of the primary part of the optic tract, concerning which statements in literature are very few and agree but little. In the calcarine fissure of the brain of a man 32 years old, who was made totally blind 8 years before by a shot wound through both optic nerves, he found a diminution of all cortical elements, especially in the lamina granularis externa and pyramidalis. Here there was in places a very marked

destruction of cells. The changes were not of the same intensity in all parts of the calcarine; on the whole, they appeared to be greater in the posterior segment. Of particular importance now is the confirmation of the fact that the change was confined to the region of the calcarine fissure while the rest of the occipital cortex remained free. From this result the writer concludes that the visual centre may be localized in the circumscribed region of the calcarine fissure.

33. STANCULEANU and MICHAIL (Bucharest): **The histologic study of the extracted capsule of senile cataract.**

1. The central part of the capsules shows: Large polygonal cells for the most part stained dark; the clear cells show round vacuoli in the neighborhood of the nucleus and, what is particularly important for the central cells, vacuoli of the nucleus.

2. The peripheral part of the epithelium of the capsule shows a great number of epithelial cells which become smaller in size as the equatorial zone is approached. The cells are either dark or clear, the protoplasm contains vacuoli which form a network with round meshes. Other cells are provided with offshoots like dentations which form a network with triangular or rectangular meshes. Hydropic cells are found at the periphery.

3. In all parts of the epithelial capsule are found germinative centres (cells with several nuclei), degenerations (clear cell extensions and colloidal transformation), thickening of the capsule, and pigment on the inner surface of the epithelial cells, or within the cells.

34. HAAB (Zürich): **The new eye magnet of the Oerlikon instrument factory near Zürich.**

Haab gave a short description of a second large eye magnet which is somewhat more powerful than the first, but uses less energy and is somewhat cheaper. It has been employed successfully in many places. The weight of the entire instrument is 130 kilos, its height about 1.35*m*. The arrangement is the same in principle as that of the first model. The magnet, which is unipolar with changeable points, lies horizontally and is movable only about its short vertical axis. The vertical suspension of the magnet the author does not favor. The form of the magnet is now that of a bell, therefore some-

what shorter and more compact. The pole used is so inclined that it allows a good command of the field of operation. The current is closed by means of the foot of the operator, a point that the author considers very important. As soon as the splinter appears behind the iris the magnetic attraction must be immediately removed, and this is accomplished more easily by opening the current than by the removal of such a powerful magnet from the eye. The giant magnet should not be handled in the same way as a small magnet. It does not succeed, even when hung so artistically as has been done by Meyrowitz. The new magnet is twice as strong as Volkmann's.

LEBER closed the meeting.

REPORT OF THE PROCEEDINGS OF THE OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

By Mr. C. DEVEREUX MARSHALL.

An ordinary meeting of the Society was held at the Medical Society's Rooms, Chandos Street, W., on Thursday, October 20, 1910. Dr. G. A. Berry, President, in the Chair.

Mr. G. Markus showed a case of **peripheral and central bulging of the cornea,** also a case which presented unilateral retraction of the upper lid and von Graefe's sign.

Mr. C. Blair showed a case of **endothelioma of the lachrimal gland.**

Mr. Leslie Paton reminded the Society of a case of **endothelioma of the orbit** in a woman. The growth was removed and then it recurred locally, and the orbit had to be eviscerated, while the lymphatics leading down to the glands were excised. The subsequent history was that there was further invasion of the glands in the anterior triangle; these were removed, and a further invasion of glands took place above the clavicle, and then the glands in the axilla were involved. She ultimately died of a very large intrathoracic secondary growth. The case was said to be pathologically simple endothelioma, but the constant recurrence of it justified one in suggesting that in this case a very thorough watch should be kept on the woman, and if there was any sign of local recurrence a radical operation should be done at once.

Mr. George Coats described the pathological features of a case of **marginal keratectasia** formerly shown to the Society by Mr. J. H. Fisher. They consisted essentially in a loss of the superficial lamellæ in the periphery of the

cornea, and their replacement by a loose vascular fibrous tissue. The membrane of Descemet had undergone enormous compensatory thickening, and showed many ruptures plastered over with new layers of hyaline substance. In one area the epithelium was œdematous and desquamating, either as a result of commencing ulceration, or of leakage from the anterior chamber. From a study of recorded cases it was shown that marginal keratectasia is usually the result of "Furrow Keratitis" (Schmidt-Rimpler) or "Marginal Atrophy of the Cornea" (Fuchs), a condition in which, without ulceration, a groove develops in the upper periphery of the cornea, usually between an arcus and the limbus; ectasia, distortion of the cornea, and astigmatism against the rule were produced by the giving way of the floor of the groove. As to pathogenesis, there were two opinions: (1) that the condition was purely degenerative, and (2) that it was inflammatory. In favor of the first, there was the common absence of injection clinically, and of round-cell infiltration microscopically, as well as the association with arcus senilis; in favor of the second, the occasional presence of injection and even photophobia, or of pseudo-pterygium or pterygium, and the fact that vessels crossed the floor of the groove. Actual ulceration was probably excluded by many cases carefully watched over long periods. It was possible that a combination of these two explanations was correct, viz., that the products of degeneration set up a low form of inflammation, or that a low form of inflammation induced degeneration.

Mr. GEORGE COATS read a paper on an **unusual instance of colloid excrescences of the membrane of Bruch.** The case was reported chiefly because it afforded an opportunity, rarely obtained, of comparing an ophthalmoscopic appearance with its histological foundation. The patient, aged 58, was achondroplasic and had glaucoma in both eyes. V. R.—Fingers at 3 feet. H.+7 D. V. L.—Perception of light.

In the right eye the media were fairly clear, and the fundus was strewn in every part with flat, scaly, irregular, white or gray areas, with a slightly wavy surface, and with distinct glitter on moving the light. The borders were sinuous and

rimmed with pigment; pigmentation also occurred on the surface, especially towards the periphery. The choroid generally was degenerate. In the left eye there was a detachment of the retina; this eye was subsequently excised. Pathological examination showed that the areas were due to an aberrant type of colloid excrescences of the membrane of Bruch. In addition to the ordinary rounded forms, flakes and irregular spongeworks of colloid material were found. The choroid was very degenerate, and showed evidence of the former presence of a flat detachment. All the measurements of the globe were notably small, and in other respects a degree of infantilism was suggested. The relationship of these conditions with the glaucoma was discussed. The glaucoma itself was peculiar in that there was no adhesion of the corneo-iridic angle, and, so far as could be seen, no hindrance to drainage. It was suggested that the rise of tension might be due simply to a disproportion between the secretion and the amount of drainage available—normal so far as it went, but insufficient. The other eye, however, though glaucomatous was not unduly small, at least in its external measurements. Another possibility was that the iris root had been in apposition with the ligamentum pectinatum, but not adherent, and had come away in the fixing fluids; or there may have been an alteration in the chemical nature of the fluid to be drained. The pathology of glaucoma with open corneo-iridic angle was discussed.

The papers were discussed by Mr. TREACHER COLLINS, Mr. MARKUS, and Mr. HERBERT FISHER.

A clinical evening was held at the Medical Society's rooms, Chandos Street, W., on Thursday, November 10, 1910, under the chairmanship of Mr. GUSTAVUS HARTRIDGE, Vice-President. Mr. WINFIELD ROLL showed a case of **sympathetic ophthalmitis** which had recovered. The patient was a boy who had his cornea wounded by means of a jagged piece of china, and sympathetic ophthalmia ensued six weeks from the original injury. Atropin and hot fomentations were applied, and mercury was given internally. He had now $\frac{6}{12}$ vision in the sympathizing eye, while vision in the eye

originally injured was $\frac{6}{36}$. No intraocular injections had been used.

Mr. GEORGE COATS showed a series of slides illustrating **atypical coloboma of the iris and lens,** with persistent mesoblastic strand. The case, he contended, favored the theory of Hess, that coloboma of the lens was due to fibrous strands of that sort. Not only the vitreous and the retina showed changes, but the choroid also. It favored the theory that atypical coloboma was due to pressure on the back of the eye of such persistent strands when the lens almost filled the eye. In the upper part of the eye there were certain areas of choroidal atrophy, although there was no persistent mesoblast. If found alone, they would be taken for patches of old choroiditis; thus illustrating the difficulty which often arose in differentiating between a congenital abnormality and a patch of inflammation. That difficulty had given rise to the idea that true coloboma did not occur in the macula; whereas Mr. Coats thought it did. The changes in the fundus exactly followed the retinal vessels. Another interesting point was in connection with the development of the zonula; he favored the mesoblastic origin. The cases upon which he based his remarks were mostly cases of aniridia.

Mr. W. H. JESSOP showed a case of **recurrent melanotic sarcoma of the conjunctiva** which was shown before the Society seven years ago. At that date the tumor, but not the eye, was removed, and proved to be melanotic sarcoma. There was a recurrence in 1904, up to which time it had remained quiet, and there were only a few brown pigment spots. It was wandering pigment. In May, 1907, there was more congestion, and then another swelling, at the site of the old one. That recurrence was removed, and the site cauterized. She came again in November this year, having had no pain, and with vision $\frac{6}{9}$, there being a small swelling under the upper lid. It was removed, with the surrounding conjunctiva, and found again to be melanotic sarcoma. Nothing more was now to be seen except two little patches. He had never seen a case of the kind last so long, with such slight recurrences. The Chairman commented on the possibility of being more conservative with eyes the seat of such tumors.

Mr. TREACHER COLLINS alluded to three cases of epibulbar sarcoma which he had removed, without taking away the eye, and there had been no recurrence; one of them having been done twenty years ago, and the patient had had the growth partly removed before he saw her. But that was not a melanotic growth, but was definitely sarcoma, as confirmed by Mr. Butlin. Mr. BREWERTON believed that in Mr. Jessop's case the outlook was now less hopeful, and that a general metastasis was setting in, which would kill the patient. Something more should, he urged, now be done to the conjunctiva, and the brown pigment patches should be excised. Mr. JESSOP also showed a case of **solitary tubercle of the choroid,** in which there had been no vitreous opacities, and very little pigmentation. The condition now looked like retinitis proliferans. Mr. J. H. TOMLINSON showed a simple projecting polariscope for use in testing color-perception, and illustrated it with a patient whose illumination-perception was normal but color-vision abnormal. Dr. JOHN HERN showed a case of **kerato-irido-cyclitis.** This condition he regarded as a clinical entity. The causation had puzzled him, but some of the patients had been syphilitic. In treatment he insisted on the value of peritomy, getting right down on the sclera by means of a small curette, to destroy the blood-vessels on the surface of the sclerotic. He usually tried treating such cases with mercury first.

Mr. BISHOP HARMAN showed twin scissors for sclerotomy (Herbert's operation), which worked like a punch, but without punching anything out. Mr. R. FOSTER MOORE showed 3 cases of severe loss of sight following hemorrhage. One was hemorrhage after miscarriage, another hæmatemesis, and the third, prolonged bleeding from the eye. Mr. JULER showed a case of **sarcoma of the iris,** the interest of which was that it might be cyst. Mr. TREACHER COLLINS said the case was under his care, having been sent to him by Mr. Taylor, of Brighton. He advised him, before sending the case up, to puncture it; that was done, but nothing escaped, and there was no alteration in the appearance of the tumor. He had been expecting to see the case. Mr. HEWKLEY showed a case of injury to the eye. It was a degenerate eye, the sight having been lost during the last nine

years. Mr. CRUISE showed a case with **fibrous mass over the disk,** which he believed to be the result of injury. There might have been a coloboma in the region of the nerve, towards the lamina cribrosa, and the coloboma might have filled up with clot. Mr. COATS believed it to be due to rupture of the nerve, but Mr. MAYOU took another view, and that the history of injury was simply a coincidence.

REPORT OF THE PROCEEDINGS OF THE SECTION ON OPHTHALMOLOGY OF THE NEW YORK ACADEMY OF MEDICINE.

By Dr. EDWARD B. COBURN, Secretary.

MEETING OF MONDAY, MAY 16, 1910. DR. H. W. WOOTTON, CHAIRMAN, PRESIDING.

Dr. LINN EMERSON presented a case of **congenitally dilated and immobile pupils** without other signs of ocular or general disease in a child of 12 years. The child shows no evidence of external disease and the pupils do not react. Vision is $\frac{20}{20}$ and vision for near was Jaeger 1. There was no photophobia. The fundus showed some evidences of choroiditis. The teeth were pegged.

In the discussion, Dr. W. M. LESZYNSKY asked for a more complete history, especially of the family. He said there were strong suggestions of Hutchinson's teeth. He assumed that it was a case of congenital syphilis.

Dr. H. W. WOOTTON asked whether it might not be a case of absence of the cerebral nuclei. The peripheric changes in the fundus were strongly suggestive of syphilis especially when associated with the teeth.

Dr. H. H. TYSON suggested that the Wasserman reaction be tried.

Dr. M. COHEN asked if a therapeutic test had been made.

In reply Dr. EMERSON said that he had only made a hurried examination of the patient and was unable to give further information about the case.

Dr. H. H. TYSON presented a case of **retraction movements of the globe**, showing in both eyes. The patient, a woman aged 41 years, complained of poor vision in her left eye. There was no history of inflammation or injury and no evidence of lues. Upon examination of the mobility of the

eyes, abduction was absent in both eyes with the exception that at times the left eye apparently moved slightly outward beyond the median line, and upon attempted adduction the right eye turned in and receded and the left eye would turn up and recede markedly into the orbit. During walking she carried her head slightly to the left. There was no diplopia on account of amblyopia ex anopsia. Refraction, O.D. +1 D. O.S. +5 D. Vision, O.D. $\frac{20}{40}$ improved by glasses to $\frac{20}{20}$ O.S. $\frac{20}{200}$, not improved by glasses. Fundus is normal. Diagnosis: Mal-development of the external recti with replacement of the muscles with fibrous bands. While quite a number of cases of this kind have been shown before this Section, this is the first case which has shown defective development of the muscles of both eyes, with such marked retraction of the globes.

Dr. A. DUANE discussed the case and said that he had seen 8 or 10 cases and that 60 or 70 had been reported. He had not seen one showing so much in both eyes. There was not much limitation inward. The upward movement is most marked. Bilateral cases are rare. The origin is not the same in all cases as shown by anatomical examination. In some cases the external rectus is replaced by a fibrous band, while in others an actual retractor tendon has been found attached to the back of the eyeball. These cases are not true paralyses, but due to changes in the muscles.

Dr. W. M. LESZYNSKY said he had published some years ago a case of a boy of 10 years, with congenital absence of the outward movements of both eyes. Opinions differed as to cause, but the mechanical theory prevailed. A baby in the same family was similarly affected. It was then called paralysis of outward movement of the eyes.

Dr. H. W. WOOTTON said that in the living subject he had dissected and found a fibrous band.

Dr. Duane said that in a case with loss of downward movement, an operation showed normal muscle and the muscle was advanced. The superior rectus was large and was tenotomized. The result was a deviation from 40° to 0°. In another patient, a girl of 7 years, with diplopia, the inferior muscle was advanced and in using the hook the muscle was torn as it was so flimsy. The result of the advancement was nil.

Dr. H. H. TYSON reported a case of **toxic amblyopia from injections of soamin** with recovery. The patient was a woman, aged 50 years, who had received injections of a total of 100 grains of soamin extending over a period of about 3 months. Her vision, which had been reduced to $\frac{4}{8}$, improved to normal in the course of three weeks after discontinuing the injections. The symptoms were those of a retrobulbar neuritis.

Dr. E. M. ALGER said that it was exceptional if such cases improved.

Dr. A. DUANE gave a demonstration of the **normal range of accommodation and its limits at each age.** He revised Donders's work. The results of clinical experience do not correspond.

We should first render eyes emmetropic with glasses and give them good vision. First use glasses and render them emmetropic with the use of a cycloplegic even up to 50 years. Often there is a latent hypermetropia of 1½ D. He uses a rule like Prince's or a Duane modification. The patient sits with the back to the light (day) and is then tested to find the near point. The test object is a white parallelogram bisected by a black hair line on velvet background. Each case was examined a number of times. The cases were plotted, the chart representing eyes and not cases. Accommodation frequently differed in the two eyes. About 800 eyes were examined. The last 200 did not change the previous 600 only in places. The charts show the maximum and minimum and the mean average range. It is desirable to know if the patient has subnormal accommodation. It is frequently found in school children with asthenopia. Excessive accommodation shows association with certain nerve lesions. Its utility consists in assisting to prescribe glasses in the presbyopic age. Also, in the younger, it suggests (if weak) the necessity for tonic treatment. The accommodation should be brought up to 3½ D. With eyes with unequal accommodation the weaker eye requires the most assistance. Fuchs has accepted Duane's chart of the range of accommodation as it is based on a larger number of cases and because Donders assumed that cases over 40 years of age were emmetropic (many had latent hypermetropia).

In the discussion, Dr. H. W. WOOTTON asked if a different glass is given in both eyes when the range differs.

Dr. DUANE replied that he always makes the attempt and about one half of the cases accept.

Dr. WOOTTON asked about Donders's claim of no hypermetropia at 70 years.

Dr. DUANE said that Donders inferred that man had no hypermetropia, but did not test thoroughly for it. We cannot make such an inference. It may develop to a certain extent due to changes in the lens. There seemed to be a diminution of myopia or increase of hypermetropia in 6 or 7 cases, about 1 to 1½ D., but it would require collective examination to determine this.

Dr. LINN EMERSON said that hypermetropia in the old is more apparent than real, especially in those who use mydriatics. A difference in accommodation is found in cases of anisometropia and he has prescribed accordingly.

Dr. F. C. ARD has found that young persons require bifocals and sometimes in only one eye.

Dr. DUANE agreed with Dr. Emerson that there is more difference in cases of anisometropia but it may be only temporary. In reply to Dr. Ard he said that he prefers not to prescribe glasses for the young but instead uses accommodation exercises, one of which consists in moving the test object to and from the patient.

MEETING OF OCTOBER 17, 1910.

Dr. R. C. DENIG presented **two cases of interstitial keratitis and one of optic atrophy treated by Ehrlich's "606."** Only one case appeared and he reported two others, one of interstitial keratitis and one of optic neuritis, which he had treated with Ehrlich's "606." He had excellent results. Denig thinks that cases that had mercurial treatment before the injection may give a better prognosis than others. Cases of interstitial keratitis that show much vascularization will also probably yield to "606" quicker than similar cases without vascularization.

Dr. M. S. KAKELS, in discussing the cases, gave the chemical formula of "606" and the method of determining the amount of arsenic in the preparation. About one third of this com-

pound is arsenic. The alkaline solution is painful and in the neutral state is not soluble but it may be used in emulsion. The dangers are that the material may be stored up in the tissues and later get a cumulative action, or that a vein may be penetrated. It is useful when mercury cannot be borne or when it is ineffectual. Patients with severe marasmus must not be injected. It seems to have three modes of action, viz., to kill the spirochætæ, to absorb the exudate, and to produce a leucocytosis and phagocytosis.

Dr. J. E. WEEKS saw a case of interstitial keratitis treated with remarkable improvement, but the opacity of the cornea still remained. The photophobia, however, disappeared.

Dr. F. N. LEWIS asked whether mercury and iodide of potash had been used in all cases.

Dr. C. W. CUTLER asked if optic neuritis had been produced.

Dr. H. W. WOOTTON said that a number of cases had been reported of general manifestation of the disease that had not been benefited by the administration of this remedy.

Dr. DENIG replied that mercury and potash had been used in all cases, and, so far as the optic nerve was concerned, no cases of optic neuritis had been reported.

Dr. R. G. REESE presented a case of **restoration of the upper lid by Wolff graft.** The patient had fallen against the charged third rail about seven years previously and the entire face had been badly burned, a condition of cicatricial ectropium of the lids of both eyes resulting. A number of unsuccessful attempts had been made to remedy the condition, until last June, when a large Wolff graft had been transplanted with a very satisfactory result. The flap was taken from the arm. Attempts will be made to remedy the remaining defects at a later date.

Dr. A. DUANE said that he saw the case six years ago at Cornell College. The present condition is a vast improvement. There was eversion of both lids with the eyes exposed but they could be covered by an effort. The corneæ were not affected.

Dr. J. E. WEEKS said that the mucous membrane of the upper lid was not destroyed, and that the flap from the arm had filled the gap in the tissues after the lid was dissected free. If the mucous membrane was left, the cul-de-sac could

be restored. He reported a case of burn with kerosene. The skin of the face was entirely burned off, but the mucous membrane of the lids was preserved though the skin and tarsi were destroyed. In that case the lids were restored by means of Wolff grafts so that the eyes were protected. The flaps measured 2¼ inches in breadth and five operations were required. Shrinking usually ceases in about three months.

Dr. E. L. OATMAN asked Dr. Weeks how he prepared a bed for the flap and whether he cut the bands or buried the edges.

Dr. WEEKS replied that he dissects down to the mucous membrane and then the detached flap is brought down and overlaps the lower lid about one half inch, and cicatricial tissue and bands are cut or removed. The skin surface is slightly undermined. In earlier cases he did not stitch the flap, but now thinks it better to unite the margins with fine sutures.

Dr. F. VALK said that when there was a tendency for the flap to slough he strapped it down with strips of adhesive plaster about one quarter inch wide.

Dr. T. R. CHAMBERS reported a case he operated on for a similar condition. The result was good at the end of four months, but there was considerable retraction at the end of six months. He thought that three months was too soon to tell what the final result would be.

Dr. F. VAN FLEET reported a case of **sarcoma of the iris** and a case of **embolism(?) of the central artery of the retina.** The patient with sarcoma of the iris did not appear and Dr. Van Fleet said that the growth was in and behind the iris as shown by the transillumination. The other patient, a printer, had suffered sudden loss of vision. He did not have syphilis and his family history was good. He attributes the trouble to turpentine. The pupil responds to light. Ophthalmoscopic examination shows a whitish retina and the nerve is also white. Part of the retina is seen with a + 6 D. giving the appearance of detached retina. There was no cherry-red spot. Œdema of the retina was marked and involved the macular region. Vision was much reduced. The veins were large, the arteries small. There had been

some improvement from the administration of potassium iodide and the œdema has subsided. The question was whether it was a case of embolism or thrombosis. The patient was thought to have a mitral lesion but it was not definitely determined. Vision was less than $\frac{20}{100}$.

There was no discussion.

Dr. J. E. WEEKS presented a case of **tuberculosis of the choroid; recovery under treatment with tuberculin.** The patient, a girl aged 13 years, was seen in November, 1909. She then had a grayish patch to the temporal side and below the macula of the left eye. There was slight exudation and haziness of the vitreous. The Wasserman reaction was negative, but mercury and potassium iodide were given for three weeks without improvement. Then tuberculin was used for the general and local reaction and both appeared. The conjunctiva was congested and the fundus more cloudy. Tuberculin in doses of $\frac{1}{10}mg$ was given every five days for sixty doses. Now there is only a cicatrix on the former site of the disease. The vision was then $\frac{20}{100}$ and is now $\frac{20}{70}$. She was examined for tuberculosis of other parts but with negative results. The patch of pigment seems to indicate a number of miliary tubercles. He thinks it may have been a conglomerate tubercle of the choroid.

Dr. C. KOLLER discussed the case and showed a number of pictures of tubercular choroiditis. Ordinarily it shows in the last stages of tuberculosis or meningitis. Tuberculosis of the choroid is a benign disease and may occur without general tuberculosis. Michel, of Germany, says that 40% to 50% of the cases of disease of the uveal tract are tubercular. It generally attacks persons in middle age, not often below 27 years. A dark spot appears before the eye and then opacities appear in the anterior chamber. Ophthalmoscopically a focus of exudate is seen near the optic disk, looking like asbestos. The optic nerve looks woolly and this is often mistaken for optic-nerve disease. It usually lasts from ten to eleven weeks. The diagnosis may be confirmed with tuberculin. It does not require tubercular treatment, as it is a self-limited disease though recurrent. Exudation appears first, which gradually subsides, leaving atrophy with a pigmented border. It is often mistaken for syphilis. It gener-

ally appears a few disk diameters from the optic nerve. It is not so extensive as in myopia or the changes in syphilis. Later there may be small exudations near the first focus, if recurrent. It is not so widely distributed as syphilis, but is usually simple or in a chain and along the blood-vessels. Bacilli have been found in the anterior chamber. The reaction to tuberculin may be both general and local.

Dr. R. C. DENIG said there was no relation between general tuberculosis of the body and local tuberculosis in the eye.

Dr. A. DUANE said that these cases present peculiar forms. In two cases he had seen in young persons these same peculiarities were noted. There was no history of tuberculosis. There was a large detachment of the retina evidently covering a solid mass. They reacted to tuberculin, the reaction in the eye showing with punctate spots near the detachment. These were evanescent and occurred only after the injections. A large scotoma was present. One case was followed for a year, during which no change developed either local or general.

Dr. E. B. COBURN asked if transillumination had been employed.

Dr. I. M. HELLER reported a similar case occurring in a young man. A mass was seen in the left eye near the optic disk extending to the macula. Four or five years previously he had a pigmented choroiditis in his right eye. Antisyphilitic treatment was given. Vision became much impaired and an iridocyclitis increased. Von Pirquet's test was positive. Injections of tuberculin were then given, B. E. being the preparation employed. The fundus then began to clear.

Dr. J. E. WEEKS continued the discussion and said that T. R. and B. E. are similar. They are not heated and so are stronger than T. O. In consequence T. O. must be given in larger dosage. We ought to have other evidence than ophthalmoscopic. We should have local reaction even though von Pirquet and Calmette reactions are positive. In cases of iritis of tubercular type, injections of T. O. cause considerable increase around the mass. It is also true that we may have choroiditis from the intestinal tract and from syphilis. The tubercular masses may be made up of multiple

foci, and in the atrophic stage the pigment will be found arranged in circles.

Dr. W. B. WEIDLER presented a case of **keratitis rosacea.** A brief description of acne rosacea was given, which usually affects only the lower ⅓ of the face. The patient, a woman aged 42 years, had an attack 12 years ago and another 7 years later. The last attack was in May, 1910, marked by photophobia and lachrymation. The right eye showed congestion of the conjunctiva and the formation of blood-vessels on the cornea. A small chalazion was present. Vision was $\frac{14}{200}$. The left eye showed the keratitis more marked and vessels enlarged. Vision was $\frac{14}{200}$. The patient is near-sighted. After an absence of two months she reappeared with the central part of the cornea protruding. Epsom salts had been given and boric acid, atropin, and dionin had been used locally. Salicylate of soda had also been administered. The disease usually appears after the meridian of life and appears like phlyctenules. Its severity depends on the severity of the facial disease. Holocain has been recommended for treatment. Reports of 14 cases were found.

Dr. J. E. WEEKS said that tuberculin may be tried. In lupus rosacea, tuberculosis is the cause.

Dr. C. KOLLER remarked that this disease is very rare in this country but quite common abroad. He has seen only about 5 cases in twenty years.

Dr. H. W. WOOTTON said that tuberculin injections were of benefit in these cases.

Dr. T. R. CHAMBERS presented a case of **foreign body in the eye removed with a small magnet.** The man was injured by a flying piece of steel entering the eyeball, leaving an opening the size of a pin-head in the inferior nasal quadrant of the iris at its periphery. Its course through the lens was readily seen when the pupil was dilated. It was resting in the lens with its point resting in the ciliary body at the upper part of the eye. The fragment of steel, measuring 4*mm*, was removed by a small magnet through the anterior chamber, leaving no mark on cornea or iris, and the eye was without irritation. It was proposed to remove the cataract at a later period.

Dr. E. B. COBURN presented **an instrument to assist in determining the axis of astigmatism.** The instrument consisted of a fenestrated framework to hold the trial-lens with a scale marked in arcs of fifteen degrees. Above and below the opening in the framework were two short finger-pieces at right angles to the main portion of the instrument by means of which the instrument was held and turned. Dependent from the lens-holding part and attached to it by two arms was a scale marked in degrees for fifteen degrees on either side of the centre line. A pendulum pointer, five inches long, marked on this lower scale the deviation of the instrument from the vertical position. The cylindrical lens is inserted in the holder in its approximate position and by turning the holder in one way or the other until best vision is obtained, the reading on the lower scale may be added to or subtracted from the angle at which the lens is held in the holder.

Dr. A. DUANE said that something more than the trial frame was necessary to obtain accuracy in the determination of the axis of the lens in the correction of astigmatism. He had tried the clinometer to determine the angles.

Dr. H. W. WOOTTON said that the trial frames are sufficiently accurate and that we can determine the position of the glass well enough for all practical purposes.

SYSTEMATIC REPORT ON THE PROGRESS OF OPHTHALMOLOGY IN THE THIRD AND FOURTH QUARTERS OF THE YEAR 1909.

By Dr. G. ABELSDORFF, in Berlin; Prof. ST. BERNHEIMER, in Innsbruck; Dr. O. BRECHT, Prof. R. GREEFF, Prof. C. HORSTMANN, and Dr. R. SCHWEIGGER, in Berlin; with the assistance of Prof. A. ALLING, New Haven; Prof. E. BERGER, Paris; Prof. CIRINCIONE, Genoa; Dr. DALEN, Stockholm; Prof. HIRSCHMANN, Charcow; Dr. J. JITTA, Amsterdam; Mr. C. DEVEREUX MARSHALL, London; Dr. H. MEYER, Brandenburg; Dr. P. VON MITTELSTÄDT, Metz; Dr. H. SCHULZ, Berlin; Prof. DA GAMA PINTO, Lisbon; and others.

Translated by Dr. MATTHIAS LANCKTON FOSTER.

(*Continued from Vol. XXXIX., page 646.*)

Sections VIII.–XII. Reviewed by DR. SCHWEIGGER, Berlin.

VIII.—LIDS.

246. STEPHENSON, SYDNEY. **The bacteriology of blepharitis ulcerosa.** *Ophthalmoscope*, July, 1909.

247. BURI, TH. **Is chalazion an acne?** *Beitraege zur Augenheilk.*, 74, p. 29.

248. ASMUS, E. **Total traumatic ptosis with ectropion cured by Kuhnt's ectropion operation and Pagenstecher's sutures.** *Zeitschrift f. Augenheilkunde*, xxii., 3, p. 222.

249. WEINSTEIN, A. **Two peculiar forms of blepharoptosis: ptosis atrophica and ptosis adiposa. A case of ptosis adiposa with spontaneous descent of the lachrymal gland.** *Klin. Monatsbl. f. Augenh.*, xlvii., ii., 2, p. 190.

250. CALDERARO. **Contribution to the study of palpebral cylindroma.** *La Clinica Oculistica*, 1908, p. 3245.

STEPHENSON (246, **The bacteriology of blepharitis ulcerosa**) has examined 50 cases of blepharitis ulcerosa with a view of determining the organisms present. The ages averaged 7½ years. Most cases showed very marked pustulation round

the roots of the lashes. The results obtained were as follows: Staphylococcus pyogenes aureus, 39 times; s. p. albus, 19; streptococcus pyogenes, 1; micrococcus citreus, 1; bacillus coli, 1; and bacillus xerosis, 1. The bacillus of Morax-Axenfeld was found in one case only.

T. HARRISON BUTLER.

BURI (247, **Is chalazion an acne?**) defines chalazion as a plasmon situated in the loose connective tissue behind the tarsus and above the fornix which has a tendency to œdematous softening internally. He considers it a granuloma sui generis; it differs in many ways so markedly from acne that the two cannot be identical. K.

ASMUS (248, **Total traumatic ptosis with ectropion cured by Kuhnt's ectropion operation and Pagenstecher's sutures**) obtained a result that was good both cosmetically and optically and remained so for 3 years. He also used the method recommended by Pagenstecher for complete ptosis alone in a case of incomplete congenital ptosis, with an excellent result, after an advancement of the tendon of the levator according to Eversbusch had proved insufficient. K.

WEINSTEIN (249, **Two peculiar forms of blepharoptosis: ptosis atrophica and ptosis adiposa. A case of ptosis adiposa with spontaneous descent of the lachrymal gland**) describes a typical case of ptosis adiposa with prolapse of the lachrymal gland on one side which he examined clinically and microscopically. He thinks that in the atony of the lid there is at first a local atrophic process in the skin of unknown cause: ptosis atrophica. A ptosis adiposa develops from this through a prolapse of orbital fat. If the atrophic process involves the support of the lachrymal gland the latter prolapses. He considers it questionable whether a true ptosis adiposa, *i. e.* a hypertrophy of the fatty tissue of the normal lid, can develop. He prefers the name ptosis atrophica to be applied to this condition rather than the name blepharochalasis.

K.

CALDERARO'S (250, **Contribution to the study of palpebral cylindroma**) patient was a woman 50 years of age who had in the margin of the lid a hard, painless nodule covered by normal skin and attached to the tarsus. This was extirpated, and proved histologically to be a typical case of cylindroma.

A year later a little loss of substance appeared in the site of the former growth which presented all the characteristics of an epithelioma, a diagnosis that was confirmed histologically. The individual elements of the recurrent tumor resembled those of the primary tumor in their morphologic and chromatic appearance, but the stroma consisted of fibres, cells, and vessels, with connective tissue, and showed nowhere a trace of hyaline degeneration. Calderaro is of the opinion that the cylindroma should not be considered as a special tumor of well defined type, but as a tumor with variable cell elements in the connective-tissue stroma of which a light, refractive, homogeneous, hyaline substance is present, which is probably formed by a special ferment. This is separated from the tumor elements and possesses the power to transform the plasma filling the lymph spaces and the surrounding connective tissue into a homogeneous mass.

CALDERARO.

IX.—LACHRYMAL ORGANS.

251. SCHIRMER. **Dacryocystorrhinostomy according to Toti.** *Zeitschrift f. Augenheilkunde*, xx., vi., p. 541.

252. ZIEGLER, S. L. **Symmetrical lymphomata of the lachrymal and salivary glands. Mikulicz's disease.** *Trans. Amer. Ophth. Soc.*, 1909.

253. HARMEL. **A case of Mikulicz's disease.** *Deutsche med. Wochenschr.*, 1909, No. 37, p. 1616.

254. MIDDELDORF and MOSES. **A case of Mikulicz's disease.** *Ibid.*, No. 34, p. 1479.

255. CASALI. **Bacteriology of dacryocystitis.** *Annali di ottalmologia*, 1909, xxxvii., 1.

256. ANTONELLI. **Naso-lachrymal pathology in hereditary syphilis.** *Archives d'Ophtalmologie*, xix., p. 599.

SCHIRMER (251, **Dacryocystorrhinostomy according to Toti**) has performed the dacryocystorrhinostomy after Toti in 10 cases, not being satisfied with the simple excision of the lachrymal sac, as some lachrymation remains in all cases. Toti tries to form a new exit for the tears into the nose. The technique is as follows: Incision as for excision of the sac; its interior wall is detached from the bone down to the posterior lachrymal crest. There is excised a large piece of the interior wall of the sac and a corresponding part of the lachrymal bone, so as to form a wide connection between the sac

and the upper nasal duct. A strip of gauze is introduced from the sac into the nose, the sac is put back into its former position, the skin-incision closed by sutures. Dressing.

In 60% of the cases there was an excellent result. The suppuration of the sac disappeared immediately and the tears were running through the new exit; fluorescin appeared in a few minutes in the nose. In the remaining 40% the result was the same as after excision of the sac; that is, primary healing, no discharge from the sac, but no spontaneous escape of the tears, although he succeeded by syringing in forcing fluid into the nose. Therefore some lachrymation persisted. The cases were observed for from three to nine months and the good result remained unchanged.

The second case now reported by ZIEGLER (252, **Symmetrical lymphomata of the lachrymal and salivary glands. Mikulicz's disease**) was a negro of thirty-four exhibiting bilateral, symmetrical enlargement of the lachrymal, parotid, and submaxillary glands of eighteen months' duration. Swellings were hard, insensitive, and not adherent to the skin. Tonsils were enlarged and uvula elongated. The patient suffered from shortness of breath. Treatment consisted in tonsillotomy and clipping of the uvula and establishing free nasal breathing. This seemed to bring about gradual improvement. ALLING.

HARMEL (253, **A case of Mikulicz's disease**) describes the case of a man 24 years old who had disease of the lachrymal and salivary glands together with slightly defective intelligence. As the disease had been noticed seven years before during the developmental years he thinks it possible that it had some connection with the slight idiocy. Treatment emphasized is total removal and exposure to the X-rays.

MIDDELDORF and MOSES' (254, **A case of Mikulicz's disease**) patient was a woman 61 years old, otherwise healthy. The disease was from time to time associated with emaciation, anæmia, enlargement of the liver, great dryness of the mouth, and an acute exudative middle-ear catarrh. After a year's sickness the patient recovered completely. Perhaps repeated attacks of facial erysipelas or a persistent eczema were etiological. Iodin, mercury, arsenic, massage, and the

X-rays were used in treatment. Operative intervention, particularly of the lachrymal gland, is advised against.

CASALI (255, **Bacteriology of dacryocystitis**) has sought to determine the frequency with which the different micro-organisms are met with in the secretion of the diseased lachrymal sac. His studies covered 60 cases of dacryocystitis and led to the following results: In 50 cases of chronic dacryocystitis, either catarrhal or purulent, there were isolated the diplococcus talamon Fraenkel, 39 times, 20 times in pure culture; the streptococcus 10 times, 3 times in pure culture; the bacterium coli 7 times, once in pure culture; the staphylococcus aureus 6 times, the albus 4 times, the citreus 3 times, the xerosis bacillus 3 times, the diplococcus Friedlaender twice. In 10 cases of acute dacryocystitis: the streptococcus 10 times, 8 times in pure culture; the staphylococcus aureus once, the albus once, the xerosis bacillus once. In general the virulence of the micro-organisms was slight and in this respect no difference could be perceived between those taken from the catarrhal and from the purulent cases of dacryocystitis. CALDERARO.

ANTONELLI (256, **Naso-lachrymal pathology in hereditary syphilis**) finds a very frequent symptom of hereditary syphilis to be an exostosis of the bony nasal septum at the point of its transition into the cartilaginous septum, and other symptoms to be an atrophy of the bony septum and exostoses of the lachrymal bone which may narrow or occlude the lachrymal passage. In hereditary syphilis a dacryocystitis may occur during intra-uterine life, to which Antonelli ascribes the very rare cases of congenital fistulæ of the lachrymal sac. During extra-uterine life a dacryocystitis may develop in hereditary syphilis either primarily, without disease of the bony duct, or secondarily, in consequence of disease of the lachrymal passage, or chronic rhinitis. Only the dacryo-adenitis observed in individual cases of still-born infants, congenital dacryocystitis, and individual cases of dacryocystitis during the first year of life are produced by the spirochæta pallida; the other diseases of the adnexa of the eye caused by hereditary syphilis should be known as parasyphilitic.

BERGER.

X.—ORBITS AND ACCESSORY SINUSES

257. CRAMER, MAX. **Bacillus subtilis in an orbital abscess.** *Klin. Monatsbl. f. Augenheilkunde*, xlvii., ii., 1, p. 46.

258. VERDERAME, PH. **Transplantation of fat for adherent bony scars at the margin of the orbit.** *Ibid.*, 3, p. 433.

259. CASALI. **Dermoid cyst of the orbit with rare microscopic findings.** *Annali di ottalmologia*, 1909, xxxviii., 4.

260. REDSLOB, E. **Exophthalmos in cranial malformations.** *Klin. Monatsbl. f. Augenheilkunde*, xlvii., ii., 1, p. 31.

261. CANTONNET, A. **Latent inequality of the pupils in Basedow's disease.** *Soc. de Neurologie de Paris*, July 1, 1909.

262. SAINTON, PAUL. **Jellineck's sign in the syndrome of Basedow's disease.** *XIX. Congrès des Médecins Alienistes et Neurologistes*, Nantes, Aug. 2–8, 1909.

263. SHOEMAKER, W. T. **Adenocarcinoma of the pituitary body. Report of a case under observation for four and a half years. Pathological examination.** *Trans. Amer. Ophthalm. Soc.*, 1909.

264. ROY, D. **Report of a case of sarcoma and bone formation in an atrophic eye with presentation of specimen.** *Ibid.*, 1909.

265. SHUMWAY, E. A. **Metastatic carcinoma of the orbit with report of a case.** *Ibid.*, 1909.

266. RING, G. O. **Orbital fibroma with unusual clinical manifestations.** *Ibid.*, 1909.

267. HERZENBERG. ROB. **Casuistics of tumors of the frontal sinus.** *Deutsche med. Wochenschrift*, 1909, No. 44, p. 1919.

268. POSEY, W. C. **Paralysis of the levator palpebrarum occasioned by frontal sinusitis.** *Old Dom. Jour. of Med.*, April, 1909.

CRAMER (257, **Bacillus subtilis in an orbital abscess**) reports a case of orbital abscess from the pus of which the bacillus subtilis was cultivated. A fistula persisted after the evacuation and tamponade of the abscess until a small piece of wood was found and removed; the wound then closed within a short time. The bacillus subtilis has not been observed before as pyogenic in an orbital abscess. K.

VERDERAME (258, **Transplantation of fat for adherent bony scars at the margin of the orbit**) recommends this treatment only in cases not associated with ectropion and not due to caries of the bone, in which a cosmetic improvement is desired on account of the indrawing scar. He condemns the subcutaneous injections of paraffin that have been used in such cases because of their unpleasant and often dangerous complications. The method of operation is very simple. Under general narcosis an incision is made near the adherent

place, the scar is carefully undermined, a piece of fat is dissected from the abdominal wall and introduced into the wound, which is then carefully closed with sutures. Three cases are reported, operated on in this manner with good results. K.

Although in CASALI's case (259, **Dermoid cyst of the orbit with rare microscopic findings**) sebaceous glands, hair bulbs, sweat glands, smooth muscle fibres, all attributes of the cutis, were found, the inner surface was lined with epithelium which showed all the peculiarities of epithelium of the mucous membrane. In literature he finds only two similar observations. As regards the origin of the dermoid cyst, Casali thinks it developed as the consequence of an inclusion of a portion of the ectoderm in the orbit by the union of the outer nasal condyle with the superior maxilla. This theory is supported by the fact that the skin about the orbit and of the lids and the conjunctiva arise from the same portion of ectoderm. CALDERARO.

REDSLOB (260, **Exophthalmos in cranial malformations**) contributes the case of an 8-year-old boy with scaphocephaly and klinocephaly to our knowledge of ocular changes associated with malformations of the skull. From birth the child had had a high degree of exophthalmos, optic atrophy(?) and medullated nerve fibres. The vision was slightly reduced, the field for white was normal, that for colors moderately contracted. The left cornea showed scars from a former keratitis e lagophthalmo. The mother had Basedow's disease. In the child Redslob believed the diagnosis of Basedow's disease could be excluded, and that in very early life he had had a hydrocephalus, probably due to rickets, which had produced the high degree of exophthalmos. The presence of marked exophthalmos with scaphocephaly is extremely rare; no similar case has heretofore been described. K.

CANTONNET (261, **Latent inequality of the pupils in Basedow's disease**) found in 6 cases of Basedow's disease inequality of the pupils in reduced light, and in 8 cases inequality after instillation of 4% cocaine, which proved not a constant symptom in 4 after more instillations. BERGER.

SAINTON (262, **Jellineck's sign in the syndrome of Basedow's**

disease) observed Jellineck's symptom, pigmentation of the lids, in 5 out of 32 cases of Basedow's disease. It appears more frequently in women than in men and may be only transient. He believes that it is caused by the reaction of the suprarenal capsules and the sympathetic to the serious functional disturbances of the thyroid. BERGER.

SHOEMAKER'S (263, **Adenocarcinoma of the pituitary body. Report of a case under observation for four and a half years. Pathological examination**) patient was an unmarried woman of 35 who sought relief from pain in the left eye of one week's duration and failing vision in same eye for the past year. There was no history of headache, nausea, or vomiting at that time. The past history was negative, although her tolerance for anti-specifics pointed towards syphilis. Examination showed proptosis of the left eye and diminished abduction. Sensation was defective in the left cornea and left side of the face. Pupils normal, Wernicke's reaction negative. There was papillitis of the right eye and atrophy of the left nerve. Both fields were markedly contracted, the right temporal being abolished. Headache and vertigo appeared three months after beginning of observations. Nausea and paroxysmal vomiting occurred. Mercury and iodide appeared to relieve symptoms for a time, but the patient died during an aggravation of all the symptoms. Autopsy showed a large tumor of the hypophysis which produced erosion of the ethmoid and sphenoid bones and extended into the nasopharynx. Microscopically the tumor showed the structure of an adenocarcinoma. The optic and third nerves of the left side were infiltrated by the growth.

ALLING.

In ROY'S (264, **Report of a case of sarcoma and bone formation in an atrophic eye with presentation of specimen**) case the tumor had filled the orbit and contained an atrophic eye which was found to contain a spherical mass of bone.

ALLING.

SHUMWAY'S (265, **Metastatic carcinoma of the orbit with report of a case**) patient was a woman of 49 whose vision in the right eye had been poor for five months. Following an attack of pleurisy the eye became painful and prominent. Under he impression that panophthalmitis was

present the globe was exenterated, but the vitreous was found to be clear and a mass could be found behind the globe. A thorough physical examination then showed general carcinomatosis, primary in the left breast. Under the use of X-rays and trypsin the orbital mass apparently disappeared. At autopsy the microscope demonstrated scirrhous carcinoma of the orbit invading the optic nerve and recti muscles. Metastases were present in many organs. The cancer cells seemed to have entered through the branches of the ophthalmic artery. Only four similar cases were found in the literature. ALLING.

RING'S (266, **Orbital fibroma with unusual clinical manifestations**) patient was a man of 30 whose left eye had gradually become proptosed during the last seven years. The vision had slowly diminished and choked disk had developed. A simple fibroma the size of a walnut was found behind the globe. ALLING.

HERZENBERG (267, **Casuistics of tumors of the frontal sinus**) sums up his work as follows: the cyst arising from the mucous membrane of the frontal sinus had worn away all the adjacent bones, had dislodged the contents of the orbit, and had grown to the size of the head of the adult patient. It had also grown inward and displaced the brain so that after the extirpation of the tumor the fist could be readily placed in the cavity. Brain symptoms were completely wanting. The contents of the tumor consisted of about 1.8 kilo of a brownish muco-serous fluid. Healing by first intention on the tenth day. The cosmetic result of the operation was good although the eyeball was lost. The tumor had not caused any subjective trouble.

POSEY (268, **Paralysis of the levator palpebrarum occasioned by frontal sinusitis**) calls attention to the fact that some ocular paralyses may be due to involvement of the adjacent sinuses. Whereas complete paralysis would likely be caused by a process of considerable intensity such as cellulitis at the apex of the orbit, mild cases may occur especially from sphenoiditis without a very active process. In his case there was a very rapid improvement in the ptosis after draining the sinus.

ALLING.

XI.—CONJUNCTIVA.

269. BANE, W. C. **Pemphigus of the conjunctiva with a report of a case.** *Colorado Medicine*, June, 1909.

270. HAYASHI, M. **Contributions to the pathology of phlyctenulæ and similar processes.** *Klin. Monatsbl. f. Augenheilkunde*, xlvii., ii., 5, p. 557.

271. SCHÜTZ, A., and VIDEKY, R. **The treatment of phlyctenular diseases of the eye based on their etiology.** *Wiener klin. Wochenschr.*, 1909, No. 25.

272. BLAAUW, E. **Vernal conjunctivitis.** *Zeitschrift f. Augenheilkunde*, xxii., 4, p. 317.

273. PASCHEFF, C. **Conjunctivitis plasmacellularis.** *Archiv f. Ophth.*, lxxi., 3, p. 569.

274. KUFFLER, O. **Clinical and bacteriological studies concerning diseases of the conjunctiva and lachrymal sac, together with some cases of panophthalmitis.** *Zeitschrift f. Augenheilkunde*, xxii., 5, p. 405.

275. WALDSTEIN, E. **Histology of gonorrhœal conjunctivitis.** *Arch. f. Ophthalmologie*, lxxii., 2, p. 274.

276. MCKEE, H. **Metastatic gonorrhœal conjunctivitis. The demonstration of the gonococcus in smear and culture.** *Ophthalmology*, July, '09.

277. HALBERSTAEDTER, L., and v. PROWAZEK, S. **Chlamydozoa in non-gonorrhœal blennorrhœa neonatorum.** *Berl. klin. Wochenschrift*, 1909, No. 41, p. 1839.

278. STADFELDT, A. **Some results obtained in the treatment of ophthalmia neonatorum, as well as of gonorrhœal ophthalmia of both infants and adults.** *Hospitalstidend*, 1909, p. 473.

279. MOTAIS, M. **The treatment of diseases of the eye of the newborn with protargol.** *Bulletin de l'Académie de Médecine*, 4, 5, 1909.

280. HEERFORDT, C. F. **Subconjunctivitis epibulbaris gonorrhoica.** *Arch. f. Ophthalmologie*, lxxii., 2, p. 344.

281. CURTIL. **A case of benign diphtheritic conjunctivitis with persistence of the bacilli several months after recovery.** *Revue générale d'ophtalmologie*, xxviii., p. 433.

282. FISHER, CARL. **The differentiation of the diphtheria bacillus from other organisms morphologically similar.** *Trans. Amer. Ophthalmol. Society*, 1909.

283. TARNAWSKY, E. J. **The present standpoint in the question of trachoma.** *Wojenno Med. Journal*, Oct., 1909.

284. LINDNER, K. **The present position of trachoma investigation.** *Wiener klin. Wochenschrift*, 1909, No. 50.

285. VERHOEFF, F. H. **A rapid method of staining the trachoma bodies of Halberstaedter and v. Prowazek.** *Ophthalmic Record*, Oct., 1909.

286. CASALI. **Tuberculosis of the conjunctiva.** *Annali di ottalmol.*, 1908, xxxvii., fasc. 3, 4, 7–12, and xxxviii., fasc. 1 and 2.

287. MARCHI. **Ossification of the conjunctiva with hyaline degeneration involving a portion of the cornea.** *Ibid.*, 1908, fasc. 10 and 11.

288. VILLARD, H. **Large cyst of the upper cul-de-sac of the conjunctiva.** *Annales d'oculistique*, cxlii., p. 183.

289. WOLFRUM, M. **Nævus of the bulbar conjunctiva and sclera and its relations to melanotic tumors.** *Arch. f. Ophthalmologie*, lxxi., 2, p. 195.

290. RSCHANITZIN, THEODOR. **Casuistics of the round-celled leucosarcoma of the conjunctiva.** *Klin. Monatsbl. f. Augenheilk.*, xlvii., ii., 2, p. 167.

BANE'S (269, **Pemphigus of the conjunctiva with a report of a case**) case was a woman of 54 who showed a shrinking of the conjunctiva of the lower lid and of the adjacent ocular conjunctiva. An application of the X-ray which was intended to produce strong reaction seems to have arrested the progress of the disease. ALLING.

HAYASHI (270, **Contributions to the pathology of phlyctenulæ and similar processes**) says that the literature on this subject is small. In phlyctenular keratitis he found the first and chief changes in the uppermost layers of the parenchyma. Soon the epithelium, later Bowman's membrane, begins to sink under the destructive process. The inflammatory focus consists of leucocytes and proliferated fresh corneal cells. Few lymphocytes were demonstrable. The phlyctenulæ of the conjunctiva exhibit a similar construction; he could not find a vesicle formation like that described by v. Michel. Regarding pathogenesis, he saw several cases of conjunctival nodules which were very similar to phlyctenulæ clinically, and anatomically reminded one throughout of the structure of tuberculosis. Reports of positive tuberculosis of the palpebral conjunctiva are frequent in literature, while only 10 cases of tuberculosis of the bulbar conjunctiva have been described. He was unable to demonstrate tubercle bacilli in his cases, even by means of animal experiment. He supposes that a toxic action of the tubercle bacilli was present and thinks the probable cause of true phlyctenulæ to be an endogenous toxic infection. The fact that phlyctenulæ have been observed frequently after cutaneous inoculations of tuberculin and after the ophthalmo-reaction he considers a further evidence in favor of the probable etiologic connection between phlyctenulæ and tuberculosis.

K.

SCHÜTZ and VIDEKY (271, **The treatment of phlyctenular diseases of the eye based on their etiology**) divide phlyctenules into two groups: 1. Exudative phlyctenules, which heal under a fixed diet. 2. Cases that react with fresh phlyctenules to tuberculin and heal under tuberculin treatment. Diet plays no part in the treatment in the second group. Both authors have proceeded therapeutically in accordance with this idea and present their results in a series of clinical histories. K.

BLAAUW (272, **Vernal conjunctivitis**) says that in addition to the tarsal and bulbar forms of this disease there is a third unmixed form that exhibits much similarity to papillary trachoma. Diagnostic characteristics are, first, the slow development of a fine, milky cloudiness, probably of fibrinous nature, on the everted upper lid; and, second, the marked eosinophilia of this pseudomembrane, which is pathognomonic of vernal conjunctivitis. Certain forms of vernal conjunctivitis and papillary trachoma are very difficult to distinguish apart from the clinical picture, and the detection of eosinophilia as a pathognomonic characteristic of vernal conjunctivitis is of extraordinary importance in the differential diagnosis. The demonstration of the v. Prowazek–Halberstaedter bodies will also be of importance in this connection. K.

PASCHEFF (273, **Conjunctivitis plasmacellularis**) reports another interesting case of plasmacellular formations of the conjunctiva met with in an 8-year-old girl who was otherwise in good health. There was a slight ptosis, moderate secretion and infection, together with a sausage-like fleshy thickening of the entire conjunctiva. No true follicles were to be seen. Pathologically it was a diffuse hyperplasia of the conjunctiva which was infiltrated with strongly proliferating plasma cells; histologically the thickening showed an adenoid structure, but nowhere follicle formations. On account of the diffuse extension of the plasmacellular hyperplasia of the conjunctiva, Pascheff calls the case one of conjunctivitis plasmacellularis. The disease affected both eyes, was chronic, and tended toward hyaline degeneration. The etiology was obscure. Excision of the hyperplasia proved to be the best therapeutic measure. The differentiation of con-

junctivitis plasmacellularis from trachoma lies only in the histological condition: in the one are found infiltrations of strongly proliferating plasma cells; in the other, follicles with germ centres. Clinically there is a close resemblance between the two diseases. K.

KUFFLER (274, **Clinical and bacteriological studies concerning diseases of the conjunctiva and lachrymal sac, together with some cases of panophthalmitis**) examined clinically and bacteriologically 727 cases of conjunctivitis. He found diplobacilli the most frequent, 42%, diplobacilli and pneumococci 4%, pneumococci 8%, xerosis 6%, staphylococci 2%, gonococci and diphtheria each 1%, pneumobacilli only once in the 727 cases. Cases with negative bacteriological findings amounted to 36%. To the last group belong the cases of follicular catarrh, the examination of which usually gives a negative result, those of conjunctivitis from thermic, chemical, and mechanical causes, and the typical acute catarrhal conjunctivitis. In the latter the infectiousness must be due to an agent not yet demonstrated. Finally he gives the result of 40 bacteriological examinations in cases of dacryocystitis and dacryoblennorrhœa. Like most investigators he found pneumococci to be the most frequent excitant. In panophthalmitis he found the bacillus subtilis many times, as well as pneumococci, and in one case a rare excitant, the streptococcus mitior.

WALDSTEIN (275, **Histology of gonorrhœal conjunctivitis**) finds that in general the superficial layers of the conjunctiva are involved in gonorrhœal conjunctivitis. The gonococci lie mainly in the upper layers of epithelium and first penetrate into the adenoid layer after injuring these. They are almost always intracellular. At first there is destruction, then from the second week, regeneration of the epithelium. In the infiltration of the adenoid tissue and the neighboring tissues the plasma cells play the chief part, while the fatty granular cells rise into importance in the later stages. The emigration of microphagi, especially polynuclear neutrophile leucocytes, plasma cells, and fatty granular cells, comes chiefly from the blood-vessels of the adenoid layer, which undergo a great increase and proliferation. He finds no notable proliferation of the connective tissue. The blennorrhœa of adults cannot

be differentiated from ophthalmia neonatorum histologically, and the abacterial form of the latter can be distinguished only through the absence of gonococci. It is worth notice that in blennorrhœa caused by the micrococcus catarrhalis the epithelium is comparatively uninjured. Waldstein believes that the active agent penetrates with difficulty and is easily removed. K.

McKee's (276, **Metastatic gonorrhœal conjunctivitis. The demonstration of the gonococcus in smear and culture**) observations seem to add weight to the opinion that this condition is produced not by toxins but by direct transference of the gonococcus to the conjunctiva through the agency of the blood current. His case was of a young man who had had a urethritis for three months, but the discharge had stopped when the eye trouble appeared. Coincident with this he had an attack of gonorrhœal rheumatism. A few Gram-negative bacilli were found among the culture of the bacillus xerosis and these were gotten in pure culture and differentiated from the meningococcus, micrococcus catarrhalis, and other Gram-negative organisms. An examination of the scrapings of the conjunctiva proved negative, but this is not surprising. ALLING.

Halberstaedter and v. Prowazek (277, **Chlamydozoa in non-gonorrhœal blennorrhœa neonatorum**) have never found the epithelial inclusions, that they first described as present in trachoma, in true gonorrhœa, but have found such as could not be distinguished from those of trachoma in the purulent eyes of infants in which no gonococci were present. They therefore conclude that these inclusions are absolutely independent formations to be found in "epithelioses," in trachoma, in non-gonorrhœal ophthalmia neonatorum, and in the non-gonorrhœal secretion of the mother of a new-born infant.

Stadfeldt (278, **Some results obtained in the treatment of ophthalmia neonatorum, as well as of gonorrhœal ophthalmia of both infants and adults**) finds that treatment with argyrol gives better results than treatment with nitrate of silver and protargol. The eyes should be washed out, every half hour during the day and every hour during the night, with physiological salt solution, and after each cleansing a 10% solution of argyrol should be freely instilled. HELLGREN.

MOTAIS (279, **The treatment of diseases of the eye of the new-born with protargol**) recommends the instillation of 2 drops of a 20% solution of protargol every three hours, applying it directly to the cornea whether ulcerated or not. He has never seen injury done to the cornea by this means, while he has seen actual improvement effected when ulceration was already present. The secretion retrogresses promptly when this treatment is methodically carried out. He also recommends it as a substitute for the nitrate of silver compulsorily used by midwives, because of its advantages and harmlessness.

HEERFORDT (280, **Subconjunctivitis epibulbaris gonorrhoica**) speaks exclusively of the endogenous gonorrhœal conjunctivitis. The inflammation is excited probably in most cases only through the toxin of the gonococcus, though it is fairly certain that gonococci are sometimes thrown off from the endogenously inflamed conjunctiva. The disease is primarily an inflammation of the epibulbar conjunctival connective tissue and runs its course, according to his observations, under the picture of typical conjunctival phlyctenulæ. When gonococci are excreted from the endogenously inflamed conjunctiva, the clinical picture must naturally become that of a mixture of the endogenous and exogenous forms. The course is exceedingly fluctuating, the prognosis good. Iritis was seldom observed; a herpetiform keratitis appeared in a third of the cases. The duration of the eye affection corresponds usually with that of the urethritis that forms its original cause. As regards diagnosis, the form with excretion of gonococci frequently cannot be distinguished from the true endogenous infection, for the other form of endogenous gonorrhœal conjunctivitis excited only through toxins a coincidently existing urethritis with joint affections is differentially diagnostic. The treatment in all cases, unless the secretion is too great, consists of gentle massage with Pagenstecher's ointment several times a day. On account of the nature of the disease Heerfordt advocates the name "subconjunctivitis epibulbaris gonorrhoica" to be applied to the endogenous gonorrhœal inflammation of the eye. K.

CURTIL (281, **A case of benign diphtheritic conjunctivitis with persistence of the bacilli several months after recovery**)

observed in a medical student who infected his left eye from a diphtheritic membrane the onset of a slight diphtheritic conjunctivitis five days later, which presented the clinical appearance of a catarrhal conjunctivitis with a slight pseudo-membrane. The conjunctivitis healed within four days after injection of diphtheria serum in the loins and instillation of the same in the conjunctival sac. In spite of complete recovery the bacilli could be demonstrated in the conjunctival sac for three months longer. BERGER.

FISHER'S (282, **The differentiation of the diphtheria bacillus from other organisms morphologically similar**) conclusions are as follows: (1) The diphtheria bacillus cannot be identified accurately by its morphology and culture alone. (2) He confirms A. Knapp's experiments in finding that the true diphtheria bacillus always ferments dextrin within forty-eight hours and never saccharose. (3) The necessity of obtaining the bacillus in pure culture renders the fermentation test of little practical value. (4) Animal inoculation is the only reliable practicable method of identifying the diphtheria bacillus. (5) In practice the diagnosis should be based chiefly upon clinical appearances and symptoms. Microscopic examination is of importance only when negative.

ALLING.

TARNAWSKY (283, **The present standpoint in the question of trachoma**) briefly reviews modern literature on trachoma. In regard to treatment his views are: 1. Since the essence of trachoma is not in the granules, but in the infiltration and adenoid hyperplasia of the conjunctiva, it is evident that treatment must not be confined to the destruction of the granules. 2. In addition to the mechanical removal of the granules a medicamental treatment of the adenoid tissue must be instituted with avoidance of the unavoidable injuries to the conjunctiva produced by surgical and mechanical interventions. 3. Rubbing the conjunctiva with cotton wet with sublimate solution, energetic massage, and other similar methods of treatment are harmful. 4. All surgical removals of large pieces of the conjunctiva are harmful. 5. The value of many of the new remedies is very problematical. Cupric sulphate, silver nitrate, and sometimes plumbic acetate remain the most satisfactory remedies.

Perhaps there is a future for iodic acid, recommended by Schiele. HIRSCHMANN.

LINDNER (284, **The present position of trachoma investigation**) found epithelial inclusions that could not be differentiated from those of trachoma in one case of blennorrhœa with gonococci and in 15 cases of ophthalmia neonatorum without gonococci. He divides the blennorrhœa of infants into two forms, one produced by the gonococcus, the other with Prowazek's inclusions. He is inclined to believe that the latter is a trachomatous disease which exhibits much similarity to the acute trachoma of adults clinically as well. It is confirmed experimentally that occasionally a virus exists in the vagina which excites a blennorrhœa and produces in monkeys a disease of the conjunctiva resembling trachoma in all respects. At any rate a trachoma of the genital passages must be granted. K.

VERHOEFF (285, **A rapid method of staining the trachoma bodies of Halberstaedter and v. Prowazek**) uses Wright's modification of Leishmann's well-known stain which requires only a few minutes. The scrapings from the cocainized conjunctiva are allowed to dry and then the slide is flooded with the staining fluid, which should act one minute. Distilled water is then added until a slight scum is formed on the surface and allowed to stand three or four minutes. Then wash with distilled water for one minute. ALLING.

CASALI'S (286, **Tuberculosis of the conjunctiva**) work forms a complete monograph concerning tuberculosis of the conjunctiva. The best means for rendering the diagnosis positive is the inoculation test, particularly on guinea-pigs. Yet as this test requires a long time one can use injections of tuberculin for diagnostic purposes when no contra-indication is present; in other cases the bacteriologic and anatomic investigations are to be carried out, as they, when positive, are of indubitable value. He considers the prognosis favorable when the lesions in the conjunctiva are circumscribed and a proper treatment is instituted in good time. The prognosis is the more uncertain the more extensive the lesions are. If not interfered with, the disease extends and may result in the loss of vision, of the eye, or of life through metastasis. The treatment of tuberculosis of the conjunctiva is as follows:

In the neoplastic form, both bulbar and palpebral, the surest and quickest means is excision with subsequent cauterization and dressing with iodoform. In the ulcerous, nodular, spongy, lupous form when circumscribed in a portion of the conjunctiva, extirpation and scraping, or better the former with cauterization and iodoform dressing, is to be tried; when it is very extensive, partial extirpation, or curettage with subsequent cauterization performed at several different times, and subcutaneous injections of new tuberculin may be employed. Still it is best in these cases to secure healing and avoid deformity by the use of the X-rays, which will soon take an important place in the therapy of conjunctival tuberculosis. Six observations of this affection are then reported. Finally he comes to the experimental infection of the conjunctiva of rabbits with tubercle bacilli and finds that the introduction of bacilli into the conjunctival sac partially denuded of epithelium never results in the development of tuberculosis, even when the lids have been kept closed for three days. On the contrary the rubbing of the conjunctiva with the same instrument that served for the removal of the epithelium after it has been infected with tubercle bacilli always produces a positive result with the formation of nodules in from twelve to twenty-two days after the inoculation. In rabbits ulcerations and extensions of the nodules are rare; they usually heal spontaneously, but they may lead to the death of the animal through metastasis. CALDERARO.

MARCHI (287, **Ossification of the conjunctiva with hyaline degeneration involving a portion of the cornea**) saw in a man 65 years old a hard, immovable nodule as large as a pea beneath the skin of the right upper lid toward the inner canthus, where it had existed for four years. Another tumor covered the upper $\frac{2}{5}$ of the cornea and 3*mm* of the bulbar conjunctiva; the surface was smooth, waxy yellow, and vascularized. The least touch caused slight interstitial hemorrhages. The conjunctiva showed old cicatricial trachoma. These tumors were extirpated and the microscopical examination revealed a true ossification of the palpebral conjunctiva with hyaline degeneration and deposit of lime salts, together with a simple hyaline degeneration of the upper part of the cornea.

CALDERARO.

VILLARD (288, **Large cyst of the upper cul-de-sac of the conjunctiva**) removed from a man 28 years old a cyst as large as an almond which had started seven or eight years before in the upper conjunctival sac and by gradual growth had pressed down below the margin of the upper lid. The weight of the cyst was 3.55 grammes, half the weight of the human eye. The cyst had a connective-tissue wall with laminated pavement epithelium, which showed that the cyst did not originate from the acini of a Krause's gland and indicated the probable origin to have been from an embryonal inclusion of conjunctival tissue. BERGER.

WOLFRUM (289, **Nævus of the bulbar conjunctiva and sclera and its relations to melanotic tumors**) finds that almost all pigmentations of the conjunctiva should be designated as nævi; in addition to the epithelial pigmentation there are pigment cells in the subconjunctival tissue that are of epithelial origin. The tumors arising from these heaps of cells he takes to be carcinoma, and particularly Krompecher's basal cell cancer, because their development from the basal cells is almost always demonstrable. The genesis of nævi, or of melanosarcoma, of the uvea is quite different, as he showed pathologically in 3 cases, inasmuch as these develop from the chromatophores there present; in later stages they greatly resemble the forms of tumors observed on the conjunctiva. K.

RSCHANITZIN (290, **Casuistics of the round-celled leucosarcoma of the conjunctiva**) reports two cases of round-celled leucosarcoma of the conjunctiva. The first case was met with in a girl 7 years old who presented the initial stage of such a tumor at the inner canthus. The tumor, which existed nine months, was extremely malignant. It appeared histologically that the tumor elements were everywhere proliferated within the vessels. Clinically it was diagnosed as amyloid and the true diagnosis was made first with the microscope. Treatment with light was without result. The second case was met with in a man 68 years old who had been affected three years. The egg-shaped tumors were situated in the right upper and the left lower lid. Pathologically the great involvement of the vascular system was notable. Operation was not suggested. The writer con-

siders that an operation should be undertaken in such cases only when there is a possibility of complete removal of the tumor masses. Round-celled leucosarcomata here are extremely rare; only 17 such cases are known in literature.

K.

XII.—CORNEA, SCLERA, ANTERIOR CHAMBER.

291. WIENER, M. **Regeneration of the cornea.** *Jour. Amer. Med. Assoc.*, Sept. 4, 1909.

292. KOMOTO, J. **Congenital hereditary opacity of the cornea.** *Klin. Monatsbl. f. Augenheilkunde*, xlvii., ii., 4, p. 445.

293. ASMUS. **Bilateral syphilitic parenchymatous keratitis after a monolateral traumatism.** *Zeitschrift f. Augenheilk.*, 4, p. 335.

294. DEL MONTE. **An uncommon form of diffuse deep keratitis.** *Annali di ottalmologia*, 1908, 10, 11.

295. WEMMERSLAGER VAN SPARWONNDE, G. **Keratitis profunda scleroticans tuberculosa.** *Inaug. Diss.*, Amsterdam, 1909.

296. ASHER, W. **Keratitis gonorrhoica metastica.** *Zeitschrift f. Augenheilkunde*, xxii., 5, p. 335.

297. ERDMANN, P. **Glaucomatous increase of tension in keratitis disciformis and herpetic keratitis.** *Ibid.*, xxii., p. 30.

298. SCALINCI. **Bullous keratitis in glaucomatous eyes.** *Annali di ottalmologia*, 1909, xxxviii., 3.

299. ZENTMAYER, W. **Nodular opacities of the cornea. Report of a case.** *Ophthalmology*, July, 1909.

300. GREEN, JOHN, JR. **Nodular opacity of the cornea.** *Jour. Amer. Med. Assoc.*, Sept. 18, 1909.

301. GOLDZIEHER, W. **The cure of trachomatous pannus by the inoculation of gonorrhœal secretion.** *Wiener klin. Wochenschrift*, 1909, No. 52.

302. ORESTE, A. **Corneal infections in general and ulcers due to the diplobacillus of Petit in particular.** *Ann. d'oculistique*, cxlii., p. 266.

303. ROSENHAUCH, E. **Hypopyon keratitis with rare bacteriological findings.** *Klin. Monatsbl. f. Augenheilkunde*, xlvii., ii., 3, p. 257.

304. MELLER, J. **Ulceration of the inner surface of the cornea.** *Archiv f. Ophthalmologie*, lxxii., 3, p. 463.

305. ZADE, M. **A case of lime burn of the eye with subsequent glaucoma.** *Ibid.*, lxxii., 3, p. 507.

306. GILBERT, W. **I. Clinical and pathological cont ibutions to the knowledge of degenerative corneal diseases. II. Leucoma and bandlike opacity of the cornea.** *Ibid.*, lxxii., 2, p. 377.

307. CALDERARO. **Contribution to plastic surgery of the cornea.** *La Clinica Oculistica*, 1908.

308. WALKER. **Kerotomy.** *Ophthalmoscope*, Nov., 1909.

309. KOMOTO, J. **Contribution to the pathology of scleritis.** *Klin Monatsbl. f. Augenheilkunde*, xlvii., ii., 6, p. 761.

310. HIRSCHBERG, J., and GINSBERG, S. **A case of cyst in the anterior chamber.** *Centralbl. f. Augenheilkunde*, xxxiii., 8, p. 225.

311. ROY, J. N. **A spontaneous serous cyst floating free in the anterior chamber.** *Ophthalmology*, Oct., 1909.

Reports of regeneration of the cornea have occasionally appeared in literature. WIENER (291, **Regeneration of the cornea**) offers a preliminary report of experiments on rabbits which seem to show that when part of the cornea is removed without puncturing Descemet's membrane it will be replaced with apparently perfectly clear tissue. ALLING.

KOMOTO (292, **Congenital hereditary opacity of the cornea**) had a patient 40 years old with congenital diffuse opacity of the cornea, whose two children and a nephew suffered from the same complaint. The picture was the same in all four cases. Neither syphilis nor tuberculosis could be detected. There was no vascularization of the cornea and the other parts of the eyes were sound, except that each of the two children had congenital cataract. The idea of a fœtal keratitis that had run its course is improbable because of the exactly similar picture in the four patients. The so-called family corneal opacity was not present in these cases, because in that disease the nodules or linear opacities are central for the most part, while in these cases there was a uniform diffuse opacity of the entire cornea. Family corneal opacity also is not accustomed to be congenital, but to appear gradually. Komoto thinks these four patients had a congenital hereditary corneal opacity. K.

ASMUS (293, **Bilateral syphilitic parenchymatous keratitis after a monolateral traumatism**) gives the clinical history of a case of parenchymatous keratitis, syphilitic in its nature, that developed in both eyes after a traumatism to the left cornea. That eye exhibited a typical foreign body inflammation which on the seventh day passed over into a parenchymatous keratitis. The right eye became affected some weeks later. The patient had hereditary syphilis. The inflammation healed finally with preservation of good vision. K.

DEL MONTE'S (294, **An uncommon form of diffuse deep keratitis**) patient was a man 32 years old. History negative. A deep opacity appeared in the inner sector and then over the entire surface of the cornea, together with a system of

fine striæ which were at first horizontal and parallel with each other but later assumed a radiating arrangement. At the same time there was slight ciliary injection, slight photophobia, and lachrymation. Recovery took place in about a month and a half with vision = 1. According to Del Monte the striæ were folds of Descemet's membrane, in which and the adjacent lamellæ the disease had its principal seat.

CALDERARO.

Under the name keratitis profunda scleroticans tuberculosa WEMMERSLAGER VAN SPARWONNDE (295, **Keratitis profunda scleroticans tuberculosa**) describes three cases of progressive chronic inflammation localized in the deepest layers of the cornea which crept from the sclera toward the centre, the foci, at first isolated, becoming confluent. The middle and anterior layers were also invaded. After prolonged clinical observation the eyes were enucleated and examined histologically. In two cases the primary scleritis had healed and only atrophy of the tissue and dilatation of the vessels could be found in the sclera. Probably there is at first œdema of the margin of the cornea through diffusion of toxins, later new formation of vessels and round-cell infiltration. As it progresses the disease forms granulation tissue on the outer surface of Descemet's membrane which is later changed into connective tissue. The iris was slightly infiltrated, but the ciliary body was free. The writer thinks that these cases coincide with the keratitis demonstrated by Reis at Heidelberg in 1907. Although tubercle bacilli were not found and caseation could not be demonstrated he considers this form of keratitis to be tuberculous. VISSER.

ASHER (296, **Keratitis gonorrhoica metastatica**) saw a case of this nature in a patient who was suffering at the same time with gonorrhœal inflammation of the knee joint. The outbreak of the keratitis was preceded by a moderate conjunctivitis with severe photophobia, which had got well before the appearance of the corneal symptoms. The pus-yellow infiltrates, situated in the different layers of the cornea and varying in size from a pin's head to a lentil, disappeared almost simultaneously with the inflammation of the knee joint. The treatment was atropin and warm compresses.

K.

ERDMANN (297, **Glaucomatous increase of tension in keratitis disciformis and herpetic keratitis**) gives the clinical histories of three cases of keratitis disciformis (Fuchs) in the course of which there was a fairly great increase of tension. In only one case did hot applications and eserin suffice, in the other two paracentesis of the anterior chamber and iridectomy were necessary. The marked albuminous content of the aqueous was worthy of notice. K.

SCALINCI (298, **Bullous keratitis in glaucomatous eyes**) reports two clinical observations from which he draws the following conclusions: 1. The wall of the large corneal bleb may consist of epithelium alone; it is therefore not necessary that the newly formed membrane should be present beneath it, as claimed by Fuchs and Wirths. 2. Smaller blebs may be caused by the detachment of the superficial layer only from the subjacent layers of epithelium. 3. The double bleb (Tartuferi) is due to the simultaneous occurrence of an intra-epithelial and an epithelial bleb. This condition should be designated as a simple double bleb and differentiated from others which are produced by the detachment of the superficial from the deep layers and the detachment of this with the subjacent newly formed membrane from Bowman's membrane, to which the writer would give the name mixed double bleb. 4. Even large blebs can have walls with only proliferating epithelium without degeneration of the elements, contrary to the opinion of Brugger that the latter must always be present. 5. The cell degeneration, which may precede or follow the detachment of the epithelium, starts and increases by preference in the middle layers, the same in which proliferation is most marked; this is also a factor of importance in the degeneration of the remaining cell layers.

CALDERARO.

ZENTMAYER'S (299, **Nodular opacities of the cornea. Report of a case**) report is of the case of a woman of 28 who at 14 years of age began to lose her vision and to suffer from photophobia and congestion of the eyes. He found numerous grayish, dense opacities of various forms grouped in a somewhat irregular oval across the centre of the cornea. Besides this the whole of the cornea except the very periphery was hazy from dust-like opacities. The larger spots were just below the epi-

thelium which was elevated over them. No improvement followed treatment. The nodules under examination proved to be composed of layers of fibres in more or less advanced stages of hyaline degeneration. ALLING.

GREEN (300, **Nodular opacity of the cornea**) concludes his paper with the statement that cases of this sort that are clinically indistinguishable may have different etiology, but the clinical history and therapeutic and diagnostic action of tuberculin in his case seem to indicate that some at least are examples of attenuated tuberculosis of the cornea.

ALLING.

GOLDZIEHER (301, **The cure of trachomatous pannus by the inoculation of gonorrhœal secretion**) has obtained very good results in severe cases of pannus from the inoculation of gonorrhœal secretion taken from infants with ophthalmia neonatorum in order to get the least virulent material. He makes a very interesting observation that after the subsidence of the blennorrhœa induced by the inoculation the trachomatous infiltration of the conjunctiva may disappear, leaving the conjunctiva in a normal condition with cicatricial formation. The healing of the cornea was usually very marked.

K.

ORESTE (302, **Corneal infections in general and ulcers due to the diplobacillus of Petit in particular**) reports eight cases of corneal ulcer caused by Petit's diplobacillus. They usually appear in the centre of the cornea, are round with a slightly gray base and elevated margins. They are accompanied by hypopyon of different degrees and slight iritis which rarely results in posterior synechiæ. Photophobia and pain are not great. Fever and other general symptoms are absent. The treatment consists of atropin, cauterization with a 20% solution of zinc sulphate or better with the galvano-cautery, and in bad cases iodoform ointment. BERGER.

ROSENHAUCH (303, **Hypopyon keratitis with rare bacteriological findings**) gives the clinical histories of ten cases of hypopyon keratitis in which he determined the diplobacillus liquefaciens Petit to be the exciting agent. In five cases there was a history of traumatism, in only two was there disease of the lachrymal sac. In general the ulcers were not very similar to the ulcus serpens. Rosenhauch believes that the

diplobacilli vegetate as saprophytes in the conjunctival sac and are first able to induce ulceration after an injury to the epithelium of the cornea. Treatment with electrargol produced good results. In another case of severe keratitis he found the staphylococcus aureus sarciniformis; in still another he found an unknown Gram-negative bacillus. The literature concerning these latter exciters of hypopyon keratitis is very meagre. K.

MELLER (304, **Ulceration of the inner surface of the cornea**) accidentally discovered a true ulcus corneæ internum during the histological examination of an eye that had been enucleated because of intraocular suppuration, following an injury to the eye by a needle. The focus of disease showed three zones, a deep infiltrate from which the ulcer arose through purulent breaking down, a middle zone, and a thick anterior infiltrate dividing the diseased from the healthy corneal tissue. Bacteriologically he found Gram-positive diplococci in great abundance. He thinks that in this case there was a true bacterial infection of the posterior surface of the cornea from the exudate containing bacteria in the anterior chamber, but he maintains that under certain circumstances an exudate without germs in the anterior chamber may produce a similar condition by histolysis. He considers an ulcer on the inner surface of the cornea to be a condition secondary to a primary disease of the cornea, or to an iritis. K.

ZADE'S (305, **A case of lime burn of the eye with subsequent glaucoma**) case of lime burn in a 5-year-old child took an unusual course. The left eye, the conjunctiva and cornea of which were severely burnt, had to be enucleated because of unbearable glaucomatous attacks. The result of the anatomical examination of the eye was very interesting. The theory that a perforation of the cornea had taken place and that after the escape of the aqueous an adhesion of the surfaces had formed was not confirmed. The extensive inflammatory changes present which had led to complete occlusion of the anterior chamber and to increase of tension must have been induced only by the chemical action of the caustic. It has already been shown by animal experiment that chemical cauterization of the outside of the globe may

bring about closure of the sinus of the anterior chamber and glaucoma. The clinical confirmation of this process in man renders this case of special interest. K.

GILBERT (306, **I. Clinical and pathological contributions to the knowledge of degenerative corneal diseases. II. Leucoma and bandlike opacity of the cornea**) reports the results of his studies of the pathology of leucoma and of bandlike opacities of the cornea to be as follows: The spiral fibres of the leucoma are to be considered as either hyaline degenerated products of coagulation of the albumin, or as originating from a corresponding metamorphosis of tissue. The hyaline degeneration is primary in leucoma and bandlike opacity; the secondary calcification comes later. The hyaline degeneration shows itself often, but not always, through an ochre-yellow stain of the degenerated part. This degenerative process in a leucoma cannot be clinically diagnosed with certainty. K.

A woman 66 years old had a tumor 3*mm* in diameter in the inner-lower segment of the left cornea where it had existed somewhat less than a year. CALDERARO (307, **Contribution to plastic surgery of the cornea**) extirpated it with a trephine, the crown of which was 6*mm* in diameter, leaving Descemet's membrane intact. A piece of cornea was then taken with the same trephine from an eye enucleated for glaucoma and used to replace the loss of substance in the first eye. The flap healed in perfectly and retained its transparency. Calderaro claims that for good results in keratoplasty it is necessary (1) that Descemet's membrane be retained; (2) that the remaining corneal tissue, particularly the deep layers, be healthy; (3) that the transplanted flap be of human cornea and of its entire thickness.

CALDERARO.

WALKER (308, **Kerotomy**). This operation was devised by the author's father, G. E. Walker, to take the place of the operation advocated by Guthrie, now know as Saemisch's section.

A broad needle is entered into the sclera just behind the limbus, and pushed in until its shoulder is visible in the anterior chamber. This is repeated all round the cornea, leaving bridges the width of the needle between each section.

This operation is constantly practised at St. Paul's Hospital, Liverpool. T. HARRISON BUTLER.

KOMOTO (309, **Contribution to the pathology of scleritis**) gives the clinical history and pathology of a case of severe scleritis which was characterized by an extensive inflammation and a comparatively posterior situation of a large scleritic swelling. The etiology was obscure. The dense cellular and extremely vascular infiltration of the subconjunctival inflammation with numerous small, trachoma-like nodules, such as has already been described by Uhthoff, was of interest in the histological picture. In Japan, where scleritis is very often met with, these serious forms are frequent; they usually occur in old men, while the ordinary scleritis is more often observed in women. In the next case that comes under his observation Komoto proposes to try to shave off the inflammatory growth with a knife in addition to giving general treatment in the form of large doses of salicylates. He will do this operation during the fresh inflammation because of the serious prognosis in this form of the disease, as otherwise the eye is liable to become incurably blind. K.

In HIRSCHBERG and GINSBERG'S (310, **A case of cyst in the anterior chamber**) case a cyst filled about a third of the anterior chamber of an eye which had been penetrated by a metallic foreign body at the corneal limbus. The cyst grew, caused blindness, and finally glaucoma. The anatomical examination revealed that the inner part of the sclero-corneal wound gaped and was lined with epithelium. The epithelium of the cyst was connected nowhere any longer with that of the surface, but came through a defect in the iris. A fold of the iris at first became adherent to the cornea during the first agglutination of the wound, but became separated gradually by the cyst. The cyst had developed at first on the anterior surface of the iris, which caused the clinical picture to simulate that it had grown out of the iris.

ROY (311, **A spontaneous serous cyst floating free in the anterior chamber**) found in the anterior chamber a flattened, transparent tumor, measuring 2.5*mm* by 1.5*mm*. It was entirely free and could be displaced by movements of the eye. It was supposed to have appeared suddenly about eight years before. There was no history of traumatism. It is

believed that these cysts develop in the posterior chamber from the ciliary body or from the posterior surface of the iris and that they later become loosened and find their way through the pupil into the anterior chamber.

ALLING.

BOOK REVIEWS.

I.—**The Treatment of Cataract.** By LIEUTENANT-COLONEL HENRY SMITH, I. M. S., Amritsar, India. With 51 illustrations by Dr. D. T. Vail, Cincinnati, Ohio. 121 pages. Thacker, Spink & Company. Calcutta, 1910.

The author of this little book has had a personal experience of over 24,000 cataract extractions. This number is so enormous and so far in advance of any other operator's experience in this world, that for this reason, if for no other, the book should be interesting and instructive to all ophthalmic surgeons. Colonel Smith is, of course, best known as the originator of a cataract extraction in the capsule method which he has ardently and valiantly advocated and defended, and in which he has had an unusual experience.

The opening chapter is on the "Diagnosis and Classification of Cataract." In Smith's observation hypermature cataract is generally not the final stage of the usual cataract process as most writers describe, but is a cataract which has a special development, in which opacity and absorption progress evenly. Finally the antero-posterior diameter is contracted, the peripheral border is thin, the capsule is tough, and the lens has a uniform white appearance like polished bone. The suspensory ligament in hypermature cataracts is not weak nor are they prone to be dislocated by nature. Smith believes these erroneous views originated because the lens was frequently dislocated in the capsulotomy step of the ordinary operation.

Chapter II. gives an extremely interesting description of "Couching of the Cataractous Lens" as practised in the East. This according to Smith is a very difficult operation to do properly. In the successful cases the invariable se-

quence is gradual loss of sight after usually four years from retinal atrophy.

Chapter III. deals with "Extraction of Cataract," Daviel's operation. The preparation of the patient, the instruments, and the steps of the operation are described. There are a number of unusual observations, and certain features of the technique original with the author, which are sure to attract the interest of the reader.

"The Treatment of Immature Cataract," which is the substance of a paper which Smith read before the American Ophthalmological Society, July, 1908 (published in these ARCHIVES, 1908, p. 672), occupies Chapter IV., and precedes "Extraction of Cataract in the Capsule" in Chapter V. On the second page of this, the important, chapter of the book, the author says: "I can no more understand a man being able to operate as it should be done, from a mere written description of this operation, than I can understand a man proceeding to successfully play the violin from a written description of the art, without practice and without teaching. The art must be learned by demonstration and by actual practice before a competent operator." Anybody who has seen this operation properly performed must subscribe absolutely to the correctness of this statement. Extraction in the capsule is always difficult, many more times than the ordinary operation. Although the steps of the operation are clearly described in this book and gain wonderfully by the really excellent drawings of Dr. Vail, many incidents still remain which cannot be put down on paper. According to Smith his operation is suited especially for immature and mature cataracts. Hypermature cataracts often present the greatest difficulties, while in cataracts in children and in juveniles it should not be attempted. For the treatment of cataract in children and in juveniles, Chapter VI., the author favors extraction by Daviel's method and extracting the capsule with the iris forceps at the close of the operation.

Chapter VII. treats of the after-treatment of cataract operations. The after-cataract (Chapter VIII.) Smith prefers to extract with the iris forceps.

In Chapter VIII. the two methods of cataract extraction are compared. To the reviewer it seems that on the side of

the capsulotomy operation can be placed greater simplicity, and less vitreous prolapse (this cannot be denied, vitreous is practically never lost in the ordinary operation in the hands of a skilful surgeon); on the side of extraction in capsule, less reaction (iritis) and no secondary cataract with its complications.

As an appendix, the article on the "After-Effects of Escape of the Vitreous" by Captain Lister is given. This was read at the Bombay Medical Congress, 1909, and published in these ARCHIVES, January, 1910.

We are extremely grateful to Colonel Smith that out of his overfilled day he has taken time to write down these few chapters from his rich and unequalled experience. In the war on the capsule many factors have to be considered and many questions arise which will require time for their solution. That cataract extraction in the capsule is the ideal operation, there can be no question.

A. K.

II.—**Die Behandlung der Kurzsichtigkeit (Treatment of Myopia).** By PROFESSOR J. HIRSCHBERG. Published by Urban & Schwartzenberg, Berlin and Vienna, 1910.

This is a reprint of an essay which appeared in v. Leyden's *Deutsche Klinik am Eingang des zwanzigsten Jahrhunderts* in 1904.

The author agrees with the view that myopia results from work associated with civilization and that the disposition to myopia is transmitted by inheritance. After mentioning the anatomical and physical construction of the myopic eye the author speaks of the rules of prescription for eyeglasses. He is not a strict adherent for full correction even in lighter grades of myopia and advocates the following rules: 1. Lower grades (0.75 to 3.0 D.) can be corrected completely and in young individuals it should be done wherever possible. 2. Middle grades (3.50 to 6.0 D.), full correction, only for distance, for near work a weaker glass should be prescribed. 3. High grades (over 6.0 D.), two different glasses should be given. Stronger glasses such as 6.0 to 9.0 D. should never be worn constantly. Lenses over 10.0 D. should only be used for a short time for looking into the dis-

tance (lorgnon). Special mention is made of necessary correction of a present astigmatismus, also the full correction of both eyes in strabismus divergens.

After this complications of myopia are mentioned in anatomical sequence. 1. *Cornea.* In high grades of myopia the cornea is considerably thinned (care should be taken in cataract operations). In cases of opacities of the cornea produced by superficial or interstitial keratitis myopia is very often found. 2. *Lens.* Cataract is found more frequent in myopic subjects as early as 40–50 years of age. Myopic eyes are frequent complications in cataract extraction, partly due to the bulging of the bulbus, partly on account of prolapse of the vitreous liable to produce detachment of the retina. Those afflicted with myopia and incipient cataract complain of mouches volantes, which leads to the conclusion that the opacity of the lens is a consequence of a diseased vitreous. Subluxation of the lens is often met with in the highest grades of myopia with or without secondary glaucoma. 3. *Vitreous.* In higher grades of myopia we regularly find coarser floating opacities in the vitreous, which must not be looked upon as an exudate of the choroid, but are due to ruptures in the vitreous produced by stretching; and through their filling with fluid these portions of the vitreous become opaque. Sudden opacity is due to hemorrhage. 4. *Fundus.* The naming of the well-known changes in the fundus, known as sclero-choroiditis posterior, is incorrect, as it is not an inflammatory process but a stretching process of the choroid. The stretching produces atrophy of that portion of the choroid, and the retina naturally suffers with it. The temporal conus is partly congenital; the enlargement of the same and the circumpapillar atrophy is a consequence of the above-mentioned stretching. The changes in the macula usually begin later on, and consist principally in the rarefaction of the pigment and in retinal hemorrhages. Sometimes, when formed in children, strict dietary measures are required. In later years they become more frequent in higher grades of myopia. 5. *Disturbances of vision* in high, myopia are manifold. External causes: Fatigue due to the disturbance of muscular equilibrium in constant near-work. Micropsia is

due to stretching of the retinal cones; same cause leads to the distortion of the images. Central scotomas are due to diseased macula. Myopic retinitis cannot be taken into consideration, no more than sclero-choroiditis myopica. 6. *Optic nerve.* Besides the seeming shortening of the horizontal diameter of the disk in the ophthalmoscopic picture, there is to be found a real shortening, sometimes in conjunction with nasal conus. This as well as the nasal displacement of the retinal blood-vessels need not produce functional disturbances. Pallor and excavation of the disk show disease. Two reasons exist for this: atrophy of the macular fibres and glaucoma myopicum. 7. The genuine *staphyloma posticum* is to be considered ophthalmoscopically an excavation. The sharply defined so-called Scarpa's staphyloma either grows towards the nose or circularly and is always accompanied with considerable disturbance of sight and scotoma. 8. *Glaucoma.* Besides the usual glaucoma, which is seldom met with in myopia, there is a peculiar glaucoma myopicum. The same is produced if the limit of the elasticity of the sclera is overstepped and presents itself in three different forms: *a.* Chronic glaucoma with typical attacks; *b.* Without attacks but progressive contraction of field of vision, impairment of sight, cupping, and increased tension; *c.* Similar to the second form, but with distinct excavation of the fundus around the disk (special malignant form). 9. *Detachment of retina.* The cause is always to be looked for in the vitreous. It cannot stand the stretching, breaks, contracts, and pulls the retina along. Spontaneous re-attachment is sometimes seen in the milder form, produced by absolute rest, either anatomical only or functional too. Pigmentation in patches is always to be seen. The therapy consists in perfect quiet, rest to the eye, iodide of potash, light diaphoresis, and preparations of salicylic acid; subconjunctival injections with 1 or 2% salt solution may be tried. After 2 or 3 months of resultless treatment all treatment may be given up. Operative procedures: injections of potassium iodide in the vitreous as well as de Wecker's filtration loops of gold wire may do more harm than good. Sclerotomia and meridional severing of the retina are the oldest procedures and give sometimes good results. Too

little is known of the resection of the sclera and emptying of the subretinal fluid as recommended by Müller.

Concerning the therapeutic treatment of high degree of myopia in general, the most prominent are dietetic measures, especially the avoidance of near-work. Prolonged rest will often arrest the process. Internal medication should be in conformity with the general condition. Salt injections are recommended only in case of detachment of retina, otherwise perfectly useless. Operative methods: to arrest the progress of myopia, tenotomy on different muscles is recommended in order to lessen the damaging pressure. Author speaks much against it, and never had any good results. Extraction of the lens is a very dangerous operation, which should be done only in myopia over 15.0 D., never in cases with changes in the macula. The principal danger is the detachment of the retina. A further danger is secondary glaucoma. The extraction of the lens cannot prevent the expansion of the sclera. Curing or arresting the progress of this process cannot be taken into consideration. In general author places the greatest value on the prophylaxis, due to the principle that the disposition is inherited, but through near-work a quicker progress is to be expected. The school, school-benches, print, light, unnecessary reading and writing are important factors in the prophylaxis. In quick progress or beginning dangerous changes in the fundus, school-studies must be immediately discontinued.

E. Török.

III.—**A Treatise on Diseases of the Eye.** By John E. Weeks, M.D., Professor of Ophthalmology in the University and Bellevue Hospital Medical School, etc. 944 pages. With 528 engravings and 25 full-page plates in colors. Lea & Febiger. New York and Philadelphia, 1910. Price $6 net.

This treatise aims at completeness; it is intended not only for the undergraduate but for the general practitioner and also for the eye specialist. The arrangement of the subject-matter is the one usually adopted in larger text-books. After introductory chapters on Development and Anatomy which are illustrated by an excellent selection of drawings, a chapter on General Principles of Optics is furnished by Dr. W. N.

Souter. The various methods of examination are carefully taken up in a special chapter. The diseases of each part of the eye are then fully described. A short chapter treats on the relation of diseases of throat, nose, and accessory sinuses to the eye. In the chapter on refraction, in which this subject is thoroughly reviewed, the author says: "The student should be apprised at the start that applied refraction is one of the most important branches of ophthalmology, that it is fully worthy of his best efforts, and that its successful practice requires a comprehensive knowledge of the subject and the most discriminating judgment." A chapter on Movements of the Eyeball and their Anomalies is from the authoritative pen of Dr. Alexander Duane. The subject of Eye-operations is treated in a sound and conservative manner; it is one of the best chapters in the book. Under the title of Special Remedies many of the newer methods of treatment, such as that with tuberculin, are given. Finally a chapter is devoted to microscopic and bacteriologic technique in the examination of secretions.

Dr. Weeks has given us a book which is complete and up-to-date; it shows the expenditure of a vast amount of labor. The style is uninvolved and pleasing in its simplicity. It can be safely recommended to all those who desire an exhaustive text-book, as it will surely take its place among the best books on Ophthalmology in English. A word of praise should be spoken for the get-up of the book; the printing and drawings are good and some of the full-page illustrations in color are really excellent.

A. K.